

NETWORK WORLD

The Newsweekly of User Networking Strategies

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ENQUIRER
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Covia plans big rollout of LAN Manager

By Paul Desmond
Senior Writer

ROSEMONT, Ill. — Covia Partnership, which runs the Apollo computer reservation network, is poised to install Microsoft Corp.'s OS/2 LAN Manager in thousands of local-area networks at airports and travel agencies.

Covia's expected rollout of LAN Manager later this year will be a major boost for the network operating system, which has been slow getting out of the starting gate. Covia, based here, will buy the software directly from Microsoft, said Mark Teflian, vice-president and chief information officer for Covia.

Currently, Covia is beta-testing Version 2.0 of LAN Manager, which it plans to run with internally developed communications software built on IBM's Network Basic I/O System. This setup will enable Covia to add security and network management features to its IBM Token-Ring Networks.

Covia opted for LAN Manager over other LAN operating systems because its support for OS/2 fits with Covia's LAN rollout strategy, said Janet Wejman, manager of microcomputer infrastructure development at Covia. Also, the application pro-

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ROARK JOHNSON/BLACK STAR © 1990

Fermi Labs' Mark Kaletka and Philip Demar survey campus map.

Fermi Labs eases traffic crunch on campus DECnet

User installs separate LAN as 'firewall' to protect local network from wide-area routing congestion.

By Jim Brown
Senior Editor

BATAVIA, Ill. — Faced with runaway network growth, Fermi National Accelerator Laboratory has devised a local-area network routing backbone to better manage wide-area links and is laying plans to migrate to DECnet Phase V to solve addressing limitations in its current Phase IV net.

Fermi, a test center for physicists who conduct experiments using an on-site particle accelerator to collide subatomic particles, supports a DECnet with almost 20,000 devices. That network is surpassed in size only by Digital

Equipment Corp.'s internal network.

Fermi's High Energy Physics network (HEPnet) enables researchers here and at various universities to access data and applications residing on the lab's DEC VAXes and Amdahl Corp. mainframes. HEPnet also lets researchers share findings with colleagues at other universities via electronic mail and file transfers.

Network growth is stretching the DECnet Phase IV installation to the maximum number of users that can be supported under the Phase IV addressing scheme, said

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IBM unveils net tools for financial sector

DataTrade lets traders gather data across nets.

By Paul Desmond
Senior Writer

PALM SPRINGS, Calif. — IBM last week unveiled client/server software that helps traders gather information from multiple sources for use in local applications.

IBM's DataTrade, announced at the company's annual Finance Industry Executive Conference here, includes communications software and an Application Program Interface (API) that together enable workstation users to cull data from applications running under different operating systems across local- or wide-area networks.

The product conforms to IBM's Systems Application Architecture and will initially support Personal System/2s, RISC System/6000s and fault-tolerant System/88 processors. That support will eventually be extended to Enterprise System/370 mainframes and Application System/400s.

Although the announcement was targeted at the financial industry, the software could be used in other businesses, said Art Simmons, a program manager in

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LAN-based ImagePlus speeds check handling.

By Walter Sweet
West Coast Correspondent

SAN FRANCISCO — IBM last week unveiled a network-based image-processing system that can help financial institutions reduce paperwork and the related costs of processing checks.

The ImagePlus High-Performance Transaction System (HPTS), a package of new and existing products, can read handwritten checks, reducing human intervention in check processing and boosting productivity, according to IBM.

The system, which is based on IBM's ImagePlus image management system, will enable banks to scan and process some checks automatically and manipulate the rest as images using IBM Personal System/2 workstations at

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Free RBHCs could stretch FCC to limit

By Mark Rockwell
Special to Network World

WASHINGTON, D.C. — As the debate intensifies over congressional efforts to free the regional Bell holding companies, users are voicing concern over whether the FCC has the resources to monitor the RBHCs' foray into new markets.

Alfred Sikes, Federal Communications Commission chairman, said he believes that the agency should take the RBHC regulatory reins from U.S. District Court Judge Harold Greene. Just such a transfer of authority is envisioned in a draft bill currently circulating on Capitol Hill that would give the carriers new freedom in information services and manufacturing.

But representatives of major user organizations say new oversight responsibilities would further tax an already overburdened FCC. Additional duties would slow key regulatory processes such as tariff reviews. Other im-

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NETLINE



AT&T EXEC promises delivery of SDDN by year end. Page 2.

3COM TO UNWRAP brouter this week at 35% less than rival products. Page 2.

THINK TANK compares int'l voice and data net costs by country. Page 2.

HP MOVES INTO 10BaseT market with hubs, net management software. Page 4.

IBM SHOWS HOW T-3 can give NSFNET a boost. Page 4.

MERRILL LYNCH enlists Teleport subsidiary to provide Centrex-like services. Page 4.

X/WINDOW USERS claim technology leaves ASCII, workstations in the dust. Page 6.

CONSIDERING CENTREX? Our Buyer's Guide can help you decide what's best. Page 35.

FEATURE



Mergers require balance of strategy, technology

By Michael Kennedy and
Clifford Worth
Special to Network World

The merger mania of the 1980s has slowed but not stopped. If your company is a target of or is considering an acquisition or merger, as network manager, you have your work cut out for you.

The merging of two separate telecommunications departments can be a delicate balancing act. Managers are responsible for combining two different communications strategies

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Exec says AT&T will intro SDDN service by year end

Data service will initially support switched digital 56K and 64K bit/sec clear-channel connections.

By Bob Wallace
Senior Editor

SAN ANTONIO, Texas — A top AT&T executive last week confirmed that the company will introduce its Software-Defined Data Network (SDDN) service by year end and revealed that the service will support higher speeds than most industry watchers expected.

Plans to roll out the long-rumored service, the data equivalent of a virtual voice network, were spelled out by Joseph Nacchio, vice-president of marketing for AT&T's Business Communications Services group, speaking before a full house at the Energy Telecommunications and Electric

cal Association (ENTELEC) conference here.

SDDN will support switched digital 56K and 64K bit/sec clear-channel connections and will be accessed through Integrated Services Digital Network Primary Rate Interface links, according to Nacchio.

A second AT&T ENTELEC speaker, James Register, a product manager for the carrier, said AT&T will introduce dial-up 64K bit/sec clear-channel capability for SDDN by year end. Early next year, the carrier will add support for switched 384K bit/sec and switched 1.544M bit/sec dial-up links. There are no plans to sup-

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3Com to introduce WAN router linking Ethernets

By Laura DiDio
Senior Editor

WASHINGTON, D.C. — 3Com Corp. is scheduled to introduce at a press conference here today a WAN bridge/router for Ethernet that is priced approximately 35% lower than competing products, according to sources within the company.

The IB/3000 Remote Bridge and Router, due out in early June, is the latest addition to 3Com's NETBuilder line of bridges introduced last year.

The IB/3000 is a stand-alone unit that can be used to link an Ethernet to up to three other remote Ethernets over wide-area network links at speeds up to

2.048M bit/sec, the European equivalent of T-1. It can forward 9,500 data packets per second and filter 22,000 packet/sec, according to analysts who have been briefed on the product.

The WAN IB/3000 is compatible with the company's existing IB/2000 and BR/2000 routers, which only link local-area networks within the same building.

Like the earlier products, the IB/3000 uses Version 2.0 of 3Com's internetwork bridge software, which enables it to act as a bridge or a router or to perform simultaneous router functions, analysts said.

The new IB/3000 device gives

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OECD report compares costs of int'l WAN service

Data could help users fine-tune int'l spending.

By Barton Crockett
Senior Editor

PARIS — A leading international think tank last week released a study comparing wide-area network service costs in 24 industrial countries.

Titled "Performance Indicators for Public Telecommunications Operators," the study by the Organization for Economic Cooperation and Development (OECD), based here, compared the cost of dedicated lines, international switched voice and national packet-switching services. The study also compiled data intended to help regulators fine-tune national policies.

"Multinational corporations can use this [study] to learn the relative costs of communications and adjust their networks accordingly," said Tim Kelly, the OECD communications policy analyst who directed the 18-month research project.

The study examined so-called baskets of services, compiled in such a manner that one country's average costs could be compared with another's. For example, OECD researchers studied the relative cost of private lines within each country by figuring the annual cost of 100 circuits, including analog leased lines, digi-

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Briefs

Bankers get US Sprint discounts. The Independent Bankers Association of America (IBAA) last week said it has signed an exclusive deal to promote US Sprint Communications Co.'s long-distance service to its 6,300 member banks in return for discounts on Dial 1, WATS and FONCARD service. Any of the 6,300 IBAA members who use US Sprint will receive a 10% discount on out-of-state Dial 1 and FONCARD calls between 8 a.m. and 5 p.m.; 4% discounts between 5 p.m. and 11 p.m.; and 3% discounts after 11 p.m. and on weekends. Out-of-state Dial 1 WATS rates will be reduced by 5% during the day. The IBAA is one of more than 100 organizations to take advantage of US Sprint's Association Member Benefit Program. The program enables associations to offer reduced-rate long-distance service to members in return for marketing the service within the organization.

IBM, Siemens, Rolm affirm strategy. Ellen Hancock, vice-president and general manager of IBM Communications Systems, Peter Pribilla, executive vice-president of Siemens AG's Private Communications Systems and Networks group, and Mitchell Watson, Rolm Co. president, last week wrapped up Rolm Update '90, a five-city marketing tour in which the trio detailed their PBX product strategy for 1,000 customers.

Watson said the vendors pledged to establish the Personal System/2 as the application platform for Siemens switches and the Rolm 9751. On the voice

mail side, Rolm and Siemens promised to implement the Audio Messaging Interface Specification — a user- and vendor-developed voice mail networking specification — within the next 18 months. Watson stressed that the latest version of Phone-mail Release 4.0 and IBM's Integrated Services Digital Network 9722 Primary Rate Interface will work with Rolm 8000 and 9000 switch lines.

Rank-and-file retirement plan. AT&T last week said it is planning an early retirement program for nonmanagement employees that could result in a large work force reduction this year. The program, which could be announced within the next few weeks, will likely be similar to an offer accepted by about 12,500 managers last year, sources said.

ABC to use T-1 broadcasting feed. ABC Radio Networks announced a deal last week with MCI Communications Corp. to feed radio shows produced in Los Angeles to its New York headquarters via a point-to-point, fiber-optic T-1 line. The fiber-optic terrestrial link replaces a satellite circuit that previously carried voice and data transmissions from Los Angeles to New York. An MCI technical consultant said that after the traffic reaches New York, it will be distributed to nearly 200 broadcasting stations via the private ABC Radio satellite net. An ABC Radio official said the company chose to migrate to the terrestrial link because it was more reliable and economical than satellites.

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HP enters 10BaseT mart with EtherTwist line, tester

Hewlett-Packard offers wire tester, six products for Ethernet over unshielded twisted-pair LANs.

By Susan Breidenbach
West Coast Bureau Chief

SANTA CLARA, Calif. — Hewlett-Packard Co. last week became the latest entrant into the nascent 10BaseT market with the introduction of six LAN products and a wire-testing instrument.

HP's new EtherTwist family of products, based on the IEEE 802.3 10BaseT draft standard for running Ethernet over standard telephone wire, replaces the company's existing Starlan 10 products and is downward-compatible with them.

The EtherTwist products consist of two 12-port hubs, network management software, a media access unit (MAU), an adapter for industry-standard personal computers and an adapter for IBM's Personal System/2s.

HP is claiming a price/perfor-

mance breakthrough with the EtherTwist line, which industry experts agreed is particularly easy to install. Users can buy an EtherTwist local-area network for \$158 to \$192 per node; other 10BaseT vendors' products cost \$208 to \$342 per node, HP said.

At the heart of each EtherTwist LAN is one or more EtherTwist Hub or EtherTwist Hub Plus box. They are 12-port intelligent wiring repeaters that can be daisy-chained together, backplane to backplane, in a rack-mounted configuration. The hubs do not require a card cage.

The hubs can also be cascaded in an expanding tree structure, using 11 of the ports for workstation attachments and the 12th for connecting to another hub. The daisy-chaining and cascading can be used to build a LAN that can

support more than 1,000 users.

Bruce Grant, vice-president of technical support for MicroAge Computer Stores, Inc., said, "The HP EtherTwist Hub is clearly the most elegant and practical product in its category."

The hubs include a BNC port for connection to a thin-wire Ethernet and an AUI port for linking to a regular coaxial or fiber-optic Ethernet. The 12 twisted-pair connections are made via a 50-pin connector that accommodates either a cable to a telephone punch-down block or a 12-port modular jack for direct workstation-to-hub links.

The difference between the regular and Plus versions of the hub is the latter's ability to accommodate HP's new OpenView Hub Manager software. "The Hub Manager makes it economical for small 12-node networks to get network management for the first time," said Carolyn Ticknor, general manager of HP's Networks Division in Roseville, Calif.

The Hub Manager supports the Simple Network Management Protocol standard and runs in a
(continued on page 53)

IBM demonstrates T-3 net adapters, software at show

Demo illustrates viability of T-3 for NSFNET.

By Laura DiDio
Senior Editor

WASHINGTON, D.C. — IBM last week demonstrated prototype network adapters and packet-switching software that enable workstation users to exchange data at T-3 speed.

IBM conducted the demonstration at the National Net '90 trade show here in conjunction with MCI Communications Corp. and the Merit Computer Network. Merit, with IBM and MCI, operates the National Science Foundation Network (NSFNET).

The demonstration was designed to illustrate how users on the research network could benefit from the use of T-3, which supports data transmissions at 45M bit/sec. NSFNET currently supports 1.544M bit/sec T-1 speeds, but it will begin supporting T-3 links during the second half of this year, according to Michael Connors, director of computing systems at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y.

NSFNET is used by 300 universities, federal research labs and corporations conducting research in conjunction with academic institutions.

In the demonstration, several of IBM's recently announced Reduced Instruction Set Computer (RISC) System/6000 workstations were directly connected to MCI fiber-optic, clear-channel T-3 circuits using prototype adapters. The workstations com-

municated over T-3 links between the conference and the NSFNET operations center in Ann Arbor, Mich.

The adapters were also used to link two RISC System/6000s locally on a 100M bit/sec Fiber Distributed Data Interface (FDDI) local-area net, Connors said.

The workstations exchanged large image files in one demonstrated application.

The IBM prototype network adapters — under development for less than a year — provide the media access control and physical layer connections to FDDI backbone nets and T-3 circuits that are usually supported by a multiplexer, according to Barry Appelman, IBM's manager of advanced information technology.

Appelman explained that multiplexers would be inadequate to handle the daily volume of traffic on the NSFNET.

Currently, 2½ billion data packets are transmitted across the NSFNET backbone every month, Appelman said. That figure is increasing at a compound monthly rate of 20%, he added.

"Multiplexed channels would only split the signal, and we need the full, higher bandwidth of T-3 to transmit that many data packets," Appelman said. "The T-3 data transmissions are also necessary for the higher raw throughput required for future NSFNET applications."

Both Appelman and Connors declined to provide any specifica-

tions of the IBM network adapters beyond saying they contain a standard microprocessor. Nor would they comment on whether or when IBM will sell the devices to commercial users.

"What we demonstrated last week is applicable in an operational environment, but it's still a prototype, and we're not announcing a new product," Connors said.

In a separate announcement, the National Science Foundation, sponsor of NSFNET, expanded the net's links with Europe last week by adding a transatlantic T-1 circuit.

The T-1 link will be provided by MCI through its Fiberline Digital Service on Trans-Atlantic Telecommunications-8, an undersea fiber-optic cable. It will connect NSFNET through a gateway in New Jersey with the European Academic Supercomputer Initiative Network (EASINET) through a gateway in Geneva.

EASINET supports 18 supercomputer sites at universities and research labs in Austria, Belgium, France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland.

Prior to installation of the T-1 link, communications between European and U.S. researchers was carried over either satellite or copper undersea cables at 64K or 56K bit/sec.

The faster data speeds will give researchers better tools with which to conduct cooperative research on complex problems such as global climate changes, genetic mapping, weather prediction and chemical molecule modeling. □

Anita Taff contributed to this article.

Nynex files for \$965m rate hike to replace earlier plan

New filing would drive up rates, impose surcharges.

By Joe Panepinto
Staff Writer

NEW YORK — As expected, Nynex Corp. filed a formal \$965 million rate hike request with the New York Public Services Commission (PSC) last week in response to the commission's recent rejection of a \$440 million rate settlement proposal.

According to New York Telephone Co., the Nynex subsidiary here, the new rate hike proposal could increase monthly charges for basic business services 11% per line, from \$12.99 to \$14.44.

The proposal would also impose a new 95-cent surcharge for each business or residential line, and a 12-cent surcharge on each Centrex line to help subsidize New York Telephone's Life Line services for the state's most needy families and the New York State Relay Service for the hearing- and speech-impaired.

Also included in the proposal are new charges for operator and directory assistance, as well as reductions in the amounts of evening and night/weekend intrastate long-distance discounts. The only rate decreases proposed by New York Telephone in the filing are a 20% drop in Touch-Tone service rates and a 10% reduction in locality mileage charges for customers in rural areas outside New York City.

The bulk of the rate increases — \$825 million — are targeted to take effect in January 1991, while the remaining rate boosts are scheduled to start the follow-

ing September. The increases would be the first for New York Telephone since it agreed to a general rate hike moratorium more than six years ago.

New York Telephone said it had hoped to avoid the present rate hike filing, which it says could take nine months and millions of dollars to be approved or denied. But on March 7, the New York PSC nixed a \$440 million rate settlement negotiated with New York Telephone due to protests from consumer advocacy groups, New York State Attorney General Robert Abrams and an administrative law judge ("PSC denies Nynex rate hike; RBHC readies appeal," NW, March 12).

Residential customers would be hit the hardest if the proposal is approved. The new rate hikes could mean a 36% increase in the average home phone bill for local service in New York City, from \$32.80 to \$44.64 per line, and a 34% increase for the same service throughout the rest of the state, from \$32.69 to \$43.83.

The most dramatic increase in the present proposal would boost the monthly charge for residential untimed message service nearly 100%, from \$7.55 to \$15.03.

In addition, connection charges for residential customers would increase a total of 56%, with the residence service order charge climbing from \$15.50 to \$21 and the residence-to-central office line connection increasing from \$37.20 to \$65. □

Teleport unit buys Merrill Lynch 5ESSs, offers Centrex

By Bob Brown
Senior Editor

NEW YORK — Merrill Lynch & Co., Inc. last week announced the sale of two AT&T 5ESS switches to a Teleport Communications Group subsidiary and retained the subsidiary to provide Centrex-like services for its headquarters and other local facilities.

Under terms of the agreement, TC Systems, Inc., a facilities management unit formed by Teleport last November, will take over the switches and offer Centrex services to Merrill Lynch and other users.

A decision by the New York State Public Service Commission (PSC) last year granting Teleport greater access to New York Telephone Co. switching facilities will smooth the way for TC Systems to provide such offerings.


Merrill Lynch is sole owner of

TC Systems and owns 97% of Teleport, a privately held company that provides alternative local transmission services to businesses in New York City.

Although the deal was announced last week, the agreement actually became effective last month. Financial terms were not disclosed.

The agreement represents another step in Merrill Lynch's outsourcing efforts. The company became a high-profile participant in the exploding outsourcing market last year when it awarded
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The West Coast news bureau of *Network World* has recently moved. It is now located at 2088 Union St., Suite 2, San Francisco, Calif. 94123; (415) 771-3530.



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X/Windows users describe performance, cost benefits

Three universities see advantages of X/Windows over ASCII terminals and graphics workstations.

By Tom Smith
New Products Editor

Early users of X/Window System say the technology maximizes network performance by splitting up processing chores among net devices and allowing a single display station to simultaneously access multiple hosts.

Three universities that have gained firsthand experience using terminals based on the windowing system, which was developed at the Massachusetts Institute of Technology, say the technology offers performance advantages over ASCII terminals and cost advantages over graphics workstations.

With X/Windows, the end-user interface is generated by the

terminal and the application is typically run on a network-attached host.

The universities are implementing X/Windows to support a variety of Unix-based network processors in applications ranging from dictionary editing to classroom instruction in software programming.

Purdue University in West Lafayette, Ind., last year tested 30 X/Window terminals in a graduate school course on window system design. The terminals provided an upgrade path from ASCII terminals and an alternative to more expensive graphics workstations.

Based on the success of that trial, the university last summer

purchased more than 100 of the terminals, according to Tim Korb, director of the university's research facilities for the computer science department.

In one subsequently developed application, the terminals are being used in computer science instruction. They enable students to compile software programs in one window, edit in another and execute programs in a third. They are also being used by clerical personnel for word processing. The terminals can access processors sitting on any of the university's multiple Ethernets, all of which are bridged together to form a backbone.

"X terminals are cheaper per seat than workstations, they're ergonomically nicer, have a smaller footprint and are easier to maintain because there's no local disk to be maintained," Korb said.

With traditional workstations, CPU-intensive applications tend to slow down or even halt a win-

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LanQuest acquires testing unit from Infonetics firm

LanQuest to conduct tests for NW LAN series.

By Alison Conliffe
Assistant Features Editor

SAN JOSE, Calif. — LanQuest Group Corp., a local-area network testing and services firm, last week announced that it has acquired the testing arm of Infonetics, Inc., a Santa Clara, Calif.-based independent market research organization.

Infonetics' test laboratory has been conducting the LAN hardware and software tests on which *Network World's* monthly LAN Test Series of feature articles is based. LanQuest's combined lab, which includes more than 70 AT-bus and Micro Channel Architecture machines, will now perform the in-depth tests that provide *Network World* readers with practical, hands-on product in-

formation.

"We have expanded our testing capabilities in terms of capacity, technical expertise in performance and compatibility testing, and the diversity of test suites," said Gail James, LanQuest's president and chief executive officer. "By more than doubling our capacity, we can now simulate a network of about 300 nodes for stress testing."

For the past three years, LanQuest has conducted more than 400 tests comparing the performance and interoperability of file servers, LAN operating systems, network adapters, workstations, bridges, routers and network analyzers. The combined lab will be housed at LanQuest's present facility here. □

Sprint Int'l signs data deals abroad

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — US Sprint Communications Co. expanded its capabilities in the international data network arena by entering into two joint ventures with foreign companies,

president of Sprint International, the reorganization and last week's moves will give domestic data communications users better access to foreign locations.

Sprint International formed a joint venture company with two telecommunications entities in the Soviet Union to provide data networks and E-mail between the U.S. and the USSR, and to distribute Telenet data communications equipment within the USSR.

The company will be owned 50% by Sprint International with the other half split between the Central Telegraph of the Soviet

OECD report compares costs

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tal 56K or 64K bit/sec links and 1.5M or 2M bit/sec facilities ranging in length from two to 200 kilometers.

Using this methodology, the report found that Spain is the most expensive country among those studied for analog circuits, with an annual cost of \$133,900 for 100 lines, followed by Turkey at \$117,000 and West Germany at \$97,400.

West Germany had the highest costs in the 1.5M/2M bit/sec category with annual expenses of \$3 million for 100 circuits, followed by Turkey at \$2.3 million and Austria at \$912,800.

Luxembourg was the least expensive country in the analog category, with annual 100-line costs of \$8,300. Denmark followed at \$11,300, and the U.K. came in third at \$13,400. These same countries also had the lowest costs in the 1.544M/2.048M bit/sec category, with annual prices of \$101,500, \$163,100 and \$172,300, respectively.

Prices for private lines in the U.S. were not included because of difficulties obtaining the proper data, Kelly said.

Switched traffic

U.S. data was included, however, in the OECD's calculations of international switched voice costs. The OECD devised a model representative of an average business' international calling patterns. Using this model, international business calling expenses for all OECD countries were calculated, averaged and assigned an index value of 100.

When carrier bills were converted into U.S. dollars, the OECD found that Australia had the lowest international calling rates for

business users, with prices at 82.4% of the OECD average.

Next came Canada, with international calling rates at 82.58% of the average, followed by the U.S. at 86.98%. The most expen-

Iceland at \$6,148. The most expensive country was Spain at \$32,623 per year, followed by West Germany at \$14,566 and Japan at \$13,417.

U.S. data also was not included

Sprint International formed a joint venture company with two entities in the Soviet Union.

▲▲▲

opening two new switching centers abroad and buying into a Pacific fiber-optic cable project.

The international projects are being undertaken by Sprint International, a newly organized unit of US Sprint into which the Telenet public data network was folded.

Telenet offers data communications products and services for such things as packet switching and electronic mail.

According to Paolo Guidi,

Ministry of Posts and Telecommunications and the Institute of Electronics and Computer Science of the Latvian Academy of Sciences.

Operations are scheduled to begin by year end.

Guidi said communications with Eastern Europe will become more important as political reforms there open greater business opportunities.

"We anticipate a huge market,"

(continued on page 51)

Correction: The article "AT&T wrestles switched access SDN time constraints" (NW, March 12) contained an inaccurate statement regarding AT&T's Software-Defined Network (SDN) service. AT&T's objective is that, by year end, switched access sites will be

added to SDN networks in five to 10 days. As the article stated, dedicated access sites will be brought onto the network in 15 days, and new SDN nets will be brought up in 30 days. AT&T said its seven provisioning data centers will be fully operational beginning next month.

Leased-line costs in nations around the world

Country	Cost in thousands of dollars, excluding taxes		
	Analog line	56K/64K bit/sec	1.544M/2.048M bit/sec
Australia	\$21.2	\$34.8	\$312.3
Austria	41.0	164.4	912.8
Belgium	16.1	172.0	484.1
Canada	28.6	58.3	658.6
Denmark	11.3	60.0	163.1
Finland	49.2	57.6	Not available
France	38.5	144.1	339.0
West Germany	97.4	287.9	2,973.7
Greece	31.5	Not available	Not available
Iceland	24.0	46.1	462.1
Ireland	25.9	53.8	314.3
Italy	56.1	86.8	868.5
Japan	55.0	188.3	644.6
Luxembourg	8.3	20.3	101.5
Netherlands	20.3	78.7	381.8
New Zealand	40.9	Not available	Not available
Norway	33.4	42.7	455.6
Portugal	39.2	Not available	Not available
Spain	133.9	283.1	Not available
Sweden	16.6	58.0	340.5
Switzerland	39.0	99.5	649.4
Turkey	117.0	525.0	2,333.5
United Kingdom	13.4	50.0	172.3

Annual cost of 100 leased circuits at distances of 2 km, 20 km, 50 km, 100 km and 200 km.

SOURCE: THE ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, PARIS
GRAPHIC BY SUSAN J. CHAMPENY

sive countries were Turkey at 126.37%, Ireland at 118.86% and Spain at 116.15%.

The OECD also examined the relative cost of national packet-switching services, where costs per year were calculated based on the transmission of approximately 1,000 files totaling around 500M bytes of data.

Here, the OECD found that New Zealand had the most attractive annual costs at \$4,387, followed by Denmark at \$5,578 and

in these calculations.

Generally, Sweden came out better than any other country in the study, Kelly said, with a combination of some of the world's best tariffs and highest quality service. He said that Southern European countries fared the worst.

The report should be available next summer for about \$40. For more information, write to the OECD's U.S. office, 2001 L St. N.W., Suite 700, Washington, D.C. 20036; (202) 785-6323. □

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to fix it than
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—a software developer

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for creating
and maintaining
applications.**

**From IBM.
And friends:**

**BACHMAN Information Systems, Inc.
Index Technology Corporation
KnowledgeWare, Inc.**

With computers humming along at 100 million instructions a second, it seems insane, but it's true:

Programmers are averaging about 10 lines of code a day, and applications are backed up 2 to 3 years.

Worse, applications now take so long to create, they can be obsolete

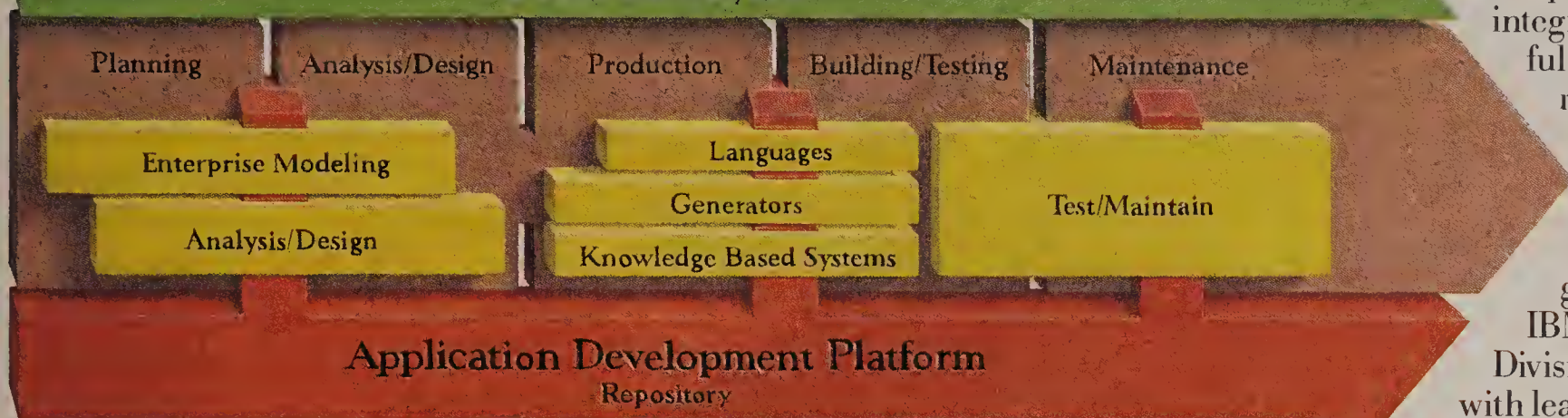
before: a consistent set of standards. Within it, all phases of the process (see diagram) can be coordinated.

It's an arsenal of tools, too: CASE tools for planning, analysis and design, a variety of 3rd-generation languages, application generators, knowledge based systems, testing and mainte-

In addition, new releases of IBM Cross System Product (our application generator) will run on both OS/2™ EE workstations and hosts. Through CSP, many AD/Cycle tools can build applications for all SAA systems: OS/2, OS/400™, VM and MVS.

And because AD/Cycle is an open architecture, many other software vendors are creating development tools that will integrate with it, taking full advantage of IBM's repository manager.

Cross Life Cycle



AD/Cycle will integrate all phases of application development.

before they're finished. And when they are finished, they require so much maintenance, many programmers don't have time to write anything new.

It's a bigger problem than IBM, or anyone else, can handle alone. So our solution, AD/Cycle, teams IBM with some special IBM business partners.

And because you can't wait, many AD/Cycle products are available now.

But before getting into who's offering what, let's look at what AD/Cycle is, and why it is the development solution for the '90s.



With AD/Cycle, planners and programmers can speak the same language.

The Right Idea.

To begin with, AD/Cycle is a framework that gives the entire development cycle something it never had

nance tools, plus cross life-cycle tools that tie everything together.

And, because a real obstacle to getting applications done right is getting people to communicate, AD/Cycle also offers a repository for sharing information: details about a company's structure and methods, expressed in a uniform way, to keep executives and programmers on the same wavelength.

Thanks to SAA™, these pieces not only will fit together but can produce code for multiple IBM operating systems. And you can use as many, or few, AD/Cycle tools as you need.

The Right Tools.

AD/Cycle has too many tools to describe them all, but here are some highlights.

Along with products from IBM, key elements of AD/Cycle are coming from BACHMAN Information Systems, Inc., Index Technology Corporation and KnowledgeWare, Inc.™

Each is a leader in CASE technology, with products that reduce years to months, and months to days.

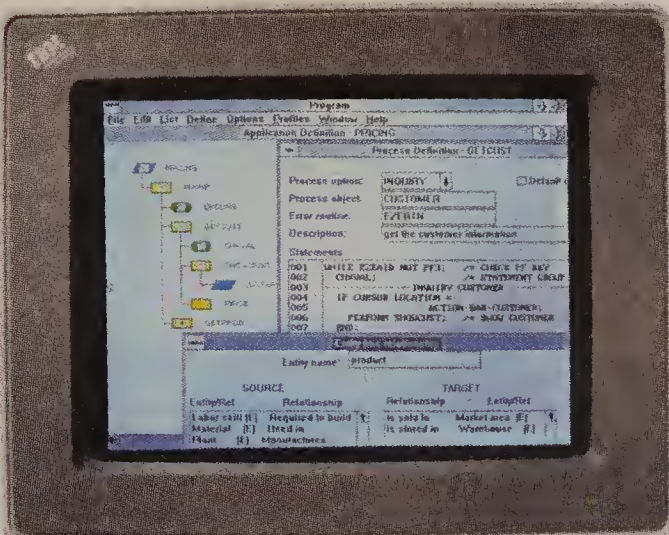
Their sets of tools will combine enterprise modeling, validation of models, data structure analysis and more, all using the graphical interface of SAA.

Right Now.

To help you get going with AD/Cycle, IBM's Systems Integration Division is joining forces with leading service companies. CAP Gemini America,

Computer Power Group, Computer Task Group and GE Consulting will be working with us to assist you in planning, training and implementation.

OS/2 EE versions of AD/Cycle tools will arrive through 1990, but you don't have to wait to get started. Many tools are available now, and with excellent track records.



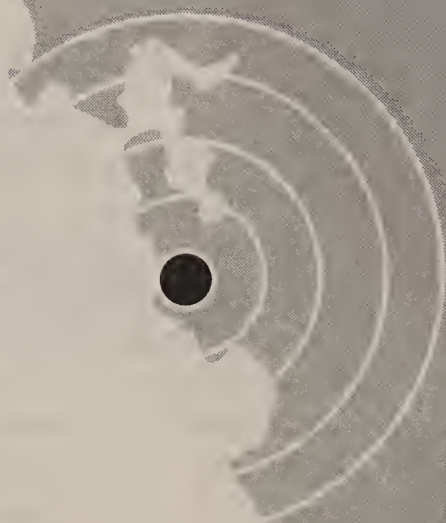
All AD/Cycle products will have the easy-to-use, SAA graphical interface.

Response to AD/Cycle, from both vendors and users, has been overwhelmingly positive. Clearly, it represents the future of application development.

So for you, the question isn't if, but when. And when is now. To get started with AD/Cycle, call your IBM Marketing Representative today.



Acts of God are just one reason we're so religious about service.



October 17, 1989: The Northern California earthquake jolts the San Francisco Bay Area. September 18, 1989: Hurricane Hugo ravages Puerto Rico. May 8, 1988: Fire devastates the Hinsdale station of Illinois Bell. In all three, network communications were severely damaged.

While such disasters are the extreme, they serve to highlight the effectiveness of vendor service—the support behind the promise. In each case, N.E.T.[™] clients were a step ahead. We kept their networks up and running.

When acts of God occur, we're ready.

The Northern California quake: When power failed, client networks rerouted automatically around downed nodes. After power was restored, the nodes were back up and running—reconfiguring to their full capabilities automatically.

Hurricane Hugo: In just two hours, we delivered a disaster recovery node to a major airline client at their Texas headquarters for flight to their Puerto Rico office.

The Hinsdale fire: Thousands of Illinois Bell's customers were down for weeks. We kept our client operational.

Nobody dedicates more resources to support you than N.E.T.

From designing a network that meets your specific requirements to keeping your network up and running at maximum performance, you can count on the N.E.T. support team.

The Technical Assistance Center (TAC) provides 24-hour-a-day, seven-day-a-week hotline service and remote diagnostics for clients.

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The Expert T-span Service designates N.E.T. as your agent to resolve carrier issues for you—fast.

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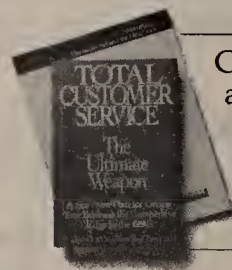
Field Service Engineers are mandated to provide solutions on receipt of first call. These senior-level technicians are located within easy reach of 60 cities in the U.S. and abroad.

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“We expect heightened competition between personal computer LAN and [minicomputer] LAN manufacturers, which will pressure personal computer LAN firms to upgrade sales and service, R&D commitments and manufacturing efficiencies.”

Excerpt from report by
Salomon Brothers, Inc.
New York

People & Positions

Stuart Mencher has been named senior vice-president and general manager of the new U.S. Distribution Division of **Codex Corp.**, a Mansfield, Mass.-based data communications equipment maker.

In his new position, Mencher is responsible for domestic sales, service and marketing.

Previously, Mencher was senior vice-president of marketing and sales for MCI Communications Corp. He has also worked for AT&T and IBM.

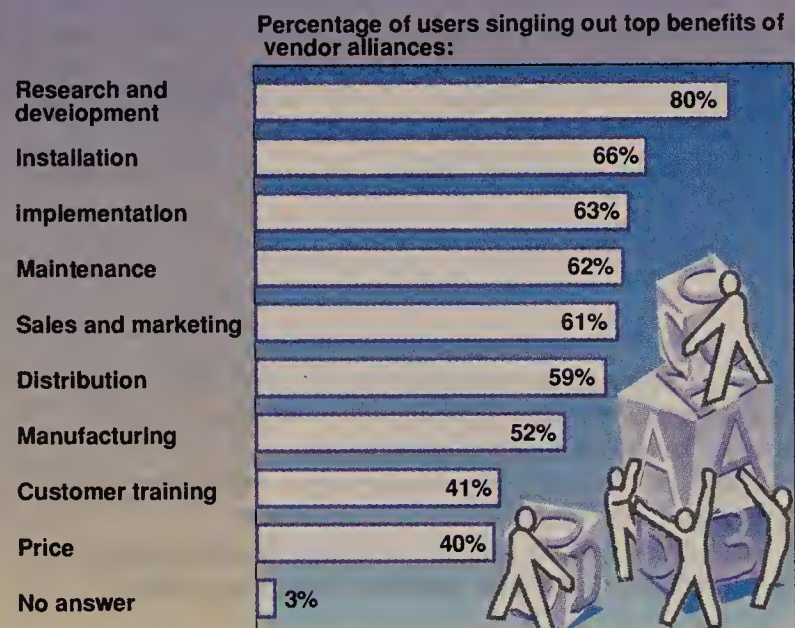
David Systems, Inc., a Sunnyvale, Calif.-based local-area network equipment maker, recently named **Curt Wheeling** vice-president of marketing.

In this newly created position, Wheeling is responsible for the company's total marketing direction.

Previously, Wheeling was area vice-president of sales for David Systems' Western region.

United Telecommunications, Inc. recently named **William Gunter** senior vice-president and controller and **Jeannine Straudjord** senior vice-president and treasurer for the company. □

Benefits of vendor alliances



Figures are based on a survey of 200 network users. Multiple responses were permitted.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MA

Survey reveals benefits of vendor alliances to users

Computer, telecom matchups produce results.

By Joe Panepinto
Staff Writer

NEWTON, Mass. — At first blush, computer manufacturers and telecommunications companies may seem like strange bedfellows, but closer scrutiny shows they were meant for each other, according to a study released last week.

The study, conducted by Business Research Group (BRG), based here, examines the growing number of what it calls “synergistic alliances” of major computer and telecommunications vendors in developing, marketing and servicing products. It concludes that vendors can benefit from such alliances by tapping into one another's resources and providing insights into distinct but converging market segments.

At the same time, the study claims, users benefit by getting innovative solutions to telecommunications and data processing problems. The study shows that 65% of 200 end users surveyed indicated that the alliances not only benefited vendors, but provided clear advantages for customers as well.

“In an increasingly sophisticated market, companies and end users need solutions to problems that call for a range of expertise,” said Paris Burstyn, vice-president of telecommunications research at BRG and the author of the study.

According to Burstyn, synergistic alliances are nonexclusive contractual agreements between vendors that differ from joint ventures because no money changes hands. The alliances also differ from connectivity agree-

ments because they are set up in order to develop applications to meet what the vendors see as evolving needs.

The study cites the alliance between Digital Equipment Corp. and Siemens Public Switching Systems, Inc. in the development of a gateway system, and the alliances of Northern Telecom, Inc. with both Hewlett-Packard Co. and DEC in the development of Integrated Services Digital Network links between minicomputers and private branch exchanges. Both alliances give users products that offer greater integration.

According to users participating in the survey, the single area of technology best suited to synergistic alliances is voice communications (33%), followed by bridge products and local-area networks (22%), and network management (11%).

Although 65% of the users in the survey indicated that they believe these alliances benefit users, there was no consensus on what the primary advantage is. In the survey, 37% perceived shared expertise as the primary benefit, while 16% said they believed the alliances made vendors better able to meet customer needs. Another 16% were undecided on how the alliances benefit users.

Two areas of concern for respondents involved the pricing of jointly developed products and the service arrangements designed to support those products.

Burstyn said vendors getting involved in synergistic alliances must set up very clear lines of responsibility in the event of user service calls. □

Net vendors jockey for outsourcing deals

Vendors team with consultants to round out net lines with required facilities management skills.

By Bob Brown
Senior Editor

Growing user interest in farming out control of voice and data networks to third parties has vendors and consultants scurrying to position themselves as attractive providers of such services.

Network equipment and service suppliers, systems integrators and consultants are forming partnerships with other companies, better organizing their existing resources and offering highly customized contracts — in some cases hiring employees from the client — in an effort to snag outsourcing contracts.

The outsourcing market, currently valued at about \$2 billion, will explode to a \$50 billion business by 1994, according to Howard Anderson, managing director of The Yankee Group, a Boston-based market research and consulting firm. By mid-decade, one out of every five Fortune 500 companies will be farming out some of its network operations, he predicted.

Vendors realize that “this market is for real,” said Rich Van-

cil, a director of The Ledgeway Group, a Lexington, Mass.-based market research and consulting division of Dataquest, Inc. “This is good news for users, as they typically reap the rewards of competition.”

The market was given a major boost earlier this year when Eastman Kodak Co., considered by many a leading-edge network user, handed over management of its worldwide Systems Network Architecture nets to IBM and its voice and non-IBM data networks to Digital Equipment Corp. (“Kodak turns nets over to IBM and DEC,” NW, Jan. 15).

Who's who

The market for outsourcing services is expected to be the domain of traditional network equipment and service vendors such as IBM, AT&T and Electronic Data Systems Corp. (EDS), as well as consulting firms such as Andersen Consulting and Arthur D. Little, Inc. These companies have experience in systems integration and facilities management.

(continued on page 12)

INDUSTRY BRIEFS

David Systems, Inc. in Sunnyvale, Calif., last week announced a multimillion-dollar distribution agreement under which **Pirelli Focom, Ltd.** of Leeds, England, will sell David Systems' ExpressNet products in Europe.

Products covered by the agreement include the ExpressNet 12-port 10BaseT hub, five-slot and 12-slot concentrators, and the recently announced VolksNet 10BaseT local-area network for smaller configurations.

According to Henry Nothhaft, president and chief executive officer of David Systems, the agreement is expected to boost the company's presence overseas. About 17% of its LAN product revenues came from overseas last year.

Pirelli, which sells a variety of network and fiber-optic cabling products, is expected to initially focus on selling the David Systems products in the U.K., France and Italy.

Tri-Data Systems, Inc. and **Advanced Computer Communications** have joined the **Open Token Foundation**, a San Jose, Calif.-based industry group advocating interoperability of token-ring local-area network products. The group now has 31 members.

Tri-Data Systems is a manufacturer of Apple Computer, Inc. Macintosh and mainframe connectivity products. It recently introduced a 16M/4M bit/sec token-ring card for the Macintosh.

“Tri-Data plugs the gap in Mac connectivity to token ring; they're one of the few companies that can support Macs in a sea of DOS,” said Colin Mick, director of the Open Token Foundation.

Advanced Computer Communications manufactures routers, bridges and network management systems. □

Vendors jockey for deals

continued from page 11

ment, and they also have large installed customer bases they could supply with outsourcing services.

Many users will figure that large equipment makers are better able to manage customer networks because they have insight into what new products and services are coming down the

road, observers speculated.

"Getting IBM or DEC to run your data center or network is an MIS manager's dream," said Norman Weizer, a senior consultant at Arthur D. Little, based in Cambridge, Mass. "It's like having an insider run your operations. They know when to move to another

operating system and when to upgrade because the guys making the equipment are the guys running it."

Earlier this year, IBM formed a new Systems Services group designed to pull together its disparate resources, including MIS and systems integration services.

"We've learned a lot of advanced management techniques and ways to run systems efficient-

ly, and we're bringing that to market," said Bill Wilson, general manager of the Systems Services organization.

Even IBM, however, realizes that it does not have every resource a user might need. One of the unit's first moves was to hire EDS founder H. Ross Perot's firm, Perot Systems, to add credibility to its facilities management expertise.

DEC, meanwhile, said it does not plan to create a separate outsourcing organization, but instead will handle outsourcing through its Enterprise Integration Services group, which also handles systems integration.

In recent months, DEC has broadened its potential market base and added management capabilities and vertical market expertise by forming partnerships with big-name management consulting firms, including Andersen Consulting, Arthur D. Little and Computer Sciences Corp.

When even large, established vendors cannot provide total outsourcing services on their own, they will not hesitate to look for help from their competitors, said Robert Snyder, product manager for Accumaster Management Services, AT&T's network management offerings.

"One day's competitor is the next day's partner," he said. "I can say that we have and are continuing to partner with other companies to win [outsourcing] business."

Aside from strategic partnerships, DEC is planning to trump up its big outsourcing win with Eastman Kodak to drum up other business.

"The Kodak contract has sparked interest in [outsourcing]," said Dick Pigman, DEC's program director for the Eastman Kodak project. "It is in our plans to leverage the Kodak relationship to go after [outsourcing] as a business."

The recent flurry of activity in the outsourcing market is somewhat ironic, according to Gary Fernandes, a vice-president at Dallas-based EDS, a longtime provider of systems integration and facilities management services. Those vendors that previously disdained outsourcing have suddenly recognized it as "the great new salvation" in the market, he said. In doing so, they have helped legitimize it.

"Outsourcing is nothing new to us," Fernandes said. "We have grown up with the market."

Still, EDS may be showing signs of adjusting to the increased competition, observers said.

Analysts speculated that one reason EDS did not get a piece of the Eastman Kodak contract was that the user wanted to assure its employees that they would have job stability with the outsourcing firm, while "lean-and-mean" EDS probably would not have wanted to boost its employment ranks.

Yet when EDS recently bought half of Texas Air Corp.'s System One reservation net, EDS agreed to take on 2,200 technical employees from System One, observers said. Those workers were hired to help EDS meet its new 10-year contract to handle data processing chores for Texas Air subsidiaries Eastern Air Lines, Inc. and Continental Airlines Corp. **■**

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TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

AT&T recently said its Software-Defined Network customer base grew from 16 at the end of 1988 to more than 600 at the end of 1989. The virtual network service was introduced in late 1985.

Carrier Watch

Joseph Nacchio, vice-president of marketing for AT&T's Business Communications Services group, reviewed AT&T's 1989 marketing performance at the Energy Telecommunications and Electrical Association conference in San Antonio, Texas, last week.

The carrier deployed Integrated Services Digital Network technology in 18 cities in 1988, advanced general availability to 62 cities by mid-1989 and to a total of 73 cities by the end of that year. By December, ISDN will be available in 290 locations.

"We forecasted [we would have] 24 users by the end of last year. The actual number was double — 48 customers. As of March 1, 60 customers were using ISDN," he said.

In his conference keynote address, Nacchio complained that rivals delayed a number of AT&T tariff filings in 1989. "We had 161 significant tariff filings, of which 31 — nearly 25% — were delayed a month on average and 14 were delayed over a month," he said.

Of the 161, not more than two or three filings were questioned by customers. "The rest were opposed by our competitors, who used the delay to their advantage," Nacchio said.

Southern Pacific Telecommunications Co. (SP Telecom), a subsidiary of San Francisco-based Southern Pacific Transportation Co., has agreed to acquire **Digital Signal, Inc.**, a Southfield, Mich.-based carrier.

The acquisition, the value
(continued on page 14)

Federal government telecom spending

Agency	Fiscal year 1989 (millions of dollars)
Department of Agriculture	\$103
Department of Commerce	\$46
Department of Defense:	
Air Force	\$740
Army	\$820
Defense Agencies	\$123
Navy	\$408
Department of Energy	\$140
General Services Administration	\$27
Department of Health and Human Services	\$167
Department of Housing and Urban Development	\$22
Department of the Interior	\$54
Department of Justice	\$112
Department of Labor	\$25
NASA	\$135
State Department	\$140
Department of Transportation	\$1,450
Department of the Treasury	\$258
Veterans Administration	\$137
Other agencies	\$445
Total	\$5,352 billion

GRAPHIC BY SUSAN SLATER

SOURCE: FROST & SULLIVAN, INC., NEW YORK

NIU Forum revamps, looks to streamline procedures

Tries to speed introduction of ISDN applications.

By Anita Taff
Washington Bureau Chief

DALLAS — Expressing concerns that the initial procedures they set up to bring Integrated Services Digital Network applications to market were no longer adequate, users of the North American ISDN Users' (NIU) Forum have launched a comprehensive review of the group's work.

At a meeting of the NIU Forum, held in conjunction with the Interface '90 Plus conference here last week, James Kendrick, chairman of the ISDN Users' Workshop, said a group of about 25 users is currently reviewing NIU Forum procedures.

The primary objective of the NIU Forum is to speed the introduction of ISDN by working out how customers can support various business applications with ISDN technology.

The NIU Forum consists of two groups: the ISDN Users' Workshop, which suggests applications; and the ISDN Implementors' Workshop, which consists of representatives from vendor companies who work out technical details of the applications.

Kendrick said the users' workshop had outgrown its original concept of three or four people meeting in a room and talking about ISDN. The group "suddenly blossomed, and we needed to have some formal structure," he said.

A source who attended a steering group meeting of the users said he is concerned about getting bogged down by the number

and scope of applications suggested. To date, 91 applications have been submitted by users and 41 have been passed on to the vendors in the implementors' group.

Because some of the applications are similar, the users face the dilemma of whether to submit them separately or modify them and submit them as one.

Adding new features to applications that are almost completed is also a problem, users say, because implementors begin to

The group "suddenly blossomed, and we needed to have some formal structure."

▲▲▲

feel the specifications will never be finalized.

In his speech to the full forum, Kendrick acknowledged indirectly that frustration has surfaced about application development. "It doesn't do any good to come in with 25 or 30 new applications that drive the implementors crazy," he said.

In order to smooth out the process, users have established an action plan based on three main objectives for the next year, Kendrick said.

(continued on page 14)

AT&T reworks HNS, targets small users

Unable to lower service prices fast enough to satisfy Marriott Corp., carrier repositions offering.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T recently scrapped its Hospitality Network Service (HNS) as a national account offering and decided to retarget the service at smaller users.

The revamping of HNS is just one example of the power large users wield in forcing carriers to offer increasingly favorable terms, conditions and service rates, industry analysts said.

AT&T was unable to salvage HNS despite asking the FCC to lower rates by 20% over the last two years. Large corporate accounts, for whom the service was designed, can get better rates by turning to offerings under Tariff 12 deals or even under AT&T's Software-Defined Network.

"With the changes in pricing and the new network plans available, [HNS] is just not the most advantageous thing for larger customers to get into," said Mark Sinclair, AT&T's national marketing manager for the lodging

industry.

HNS is a discounted 1+ calling service for hotels, hospitals and universities that resell service to occupants and have high volumes of traffic during evening and night periods. AT&T targeted national accounts for the service, requiring, among other things, that the user generate four million minutes of usage per month.

Marriott Corp. is the only customer that ever signed up for HNS, but the hotel giant recently decided to move its traffic to a Tariff 12 arrangement because of the savings potential. According to an AT&T Tariff 12 filing, Marriott will pay only 6 cents per minute — averaged across day, evening and night periods — for calls to sites 1,000 miles away.

Although Marriott could not have hoped for a rate that low in 1988, when it signed up for HNS, it was clear even then that HNS rates would have to fall rapidly to stay competitive. AT&T got the message. Almost immediately af-

(continued on page 14)

WASHINGTON UPDATE

BY ANITA TAFF

MCI still protesting FTS 2000. MCI Communications Corp. is once again protesting a government agency's proposal for use of the Federal Telecommunications System (FTS) 2000, claiming the services under consideration fall outside the scope of the original contract.

MCI is protesting a proposal from the Family Support Administration, a federal agency that tracks parents with delinquent child support payments. The agency wants to set up a nationwide network, dubbed Child Support Enforcement Network, to link state child support offices in the U.S., Puerto Rico and the U.S. Virgin Islands. The network would be built on data lines purchased from AT&T's FTS 2000 service.

MCI claimed in a letter to Carol Hall, the contracting officer on FTS 2000, that only federal, not state, agencies are eligible to use the services.

If the General Services Administration, which oversees the FTS 2000 contract, rules that the child support network falls outside the scope of FTS 2000, the services would have to be opened to bids from all interested vendors. Competitive bids are mandated by the Competition in Contracting Act of 1987.

Since MCI lost the FTS 2000 contract — worth up to \$25 billion over 10 years — to rival carriers AT&T and US Sprint Communications Co., it has waged a bitter battle to open up parts of the contract to new bids. Most recently, MCI protested against US Sprint and the Internal Revenue Service when the IRS wanted to add management features such as time-of-day routing to its 800 service. MCI claimed the new features constituted a new service and should have been opened to competitive bids. The GSA Board of Contract Appeals ruled against MCI. ■

AT&T reworks HNS, targets small users

continued from page 13

ter signing Marriott as an HNS customer, AT&T told the FCC it needed to lower HNS rates from 18 to 16.5 cents per minute.

AT&T recently returned to the FCC asking to lower HNS rates again, this time to either 14.5 or 14 cents per minute, depending on a customer's traffic volume. But now, AT&T has given up the idea of selling HNS to national accounts and is instead targeting it at smaller customers, Sinclair said.

AT&T drastically slashed the minimum traffic levels on HNS from four million minutes of usage per month to 60,000. The carrier also cut the minimum monthly

fee from \$320,000 to \$8,700.

Industry analysts said they weren't surprised that AT&T has had to rework HNS as a small to midsize business service. Robert Self, president of Market Dynamics, Inc., a consulting firm in New York, said he questioned whether the HNS rates would be competitive when AT&T first introduced the service. "The businesspeople are really putting the pressure on the carriers, and there is no question that we are in a price war," he said.

According to Self, the downward pressure on rates will continue to be applied by smaller and smaller companies.

"Users feel like if they're taking service at regular [tariffed] rates and they're very big at all, they're not doing something right," Self said. Many users are now using

the tariffed prices as a ceiling and negotiating down from there, he said.

Ron Brown, an independent consultant based in Melrose, Mass., said he believes users will continue to force prices down. "Buyers of telecommunications services have reached the point where they view standard services as commodities; they're like pork bellies, and you'd might as well get them from the lowest cost provider," Brown said.

Users now have enough bargaining power that, many times, they can get the carrier back to the table and negotiate better deals, Brown said. He said he expects users will soon be able to negotiate rates with local exchange carriers because of inroads that alternative local carriers are making. ■

Forum revamps, looks to streamline

continued from page 13

The first is to adopt a longer range vision about the features needed in an application to meet user needs. By looking out further into the future and telling implementors what they will need, users will be better able to shape future services and develop comprehensive transition plans.

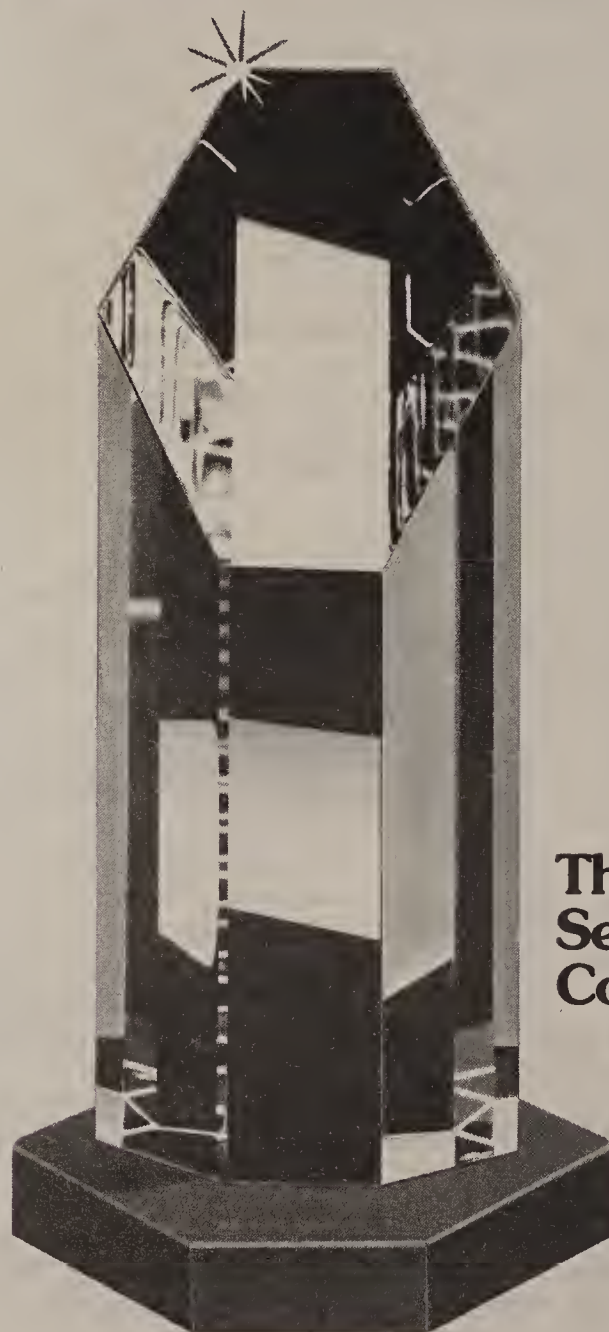
The second major goal is to formulate a process for adding new features and capabilities to applications.

The third goal is to identify which applications are close to completion and get them published as soon as possible.

Although the forum hopes these actions will accelerate the introduction of applications, an official from the General Services Administration painted a rather pessimistic picture about the prospects for implementing such applications.

Michael Corrigan, deputy commissioner of the GSA's Office of Telecommunications Services, said he wants the govern-

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“I’ve given up on seeing SS7 in a reasonable time.”

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ment to implement ISDN as soon as possible but he is not confident we will see end-to-end ISDN any time soon. The regional Bell holding companies have not committed to installing Signaling System 7 (SS7), the key to tying separate ISDN environments together.

“I’ve given up on seeing SS7 in any reasonable time frame,” Corrigan said.

Instead, the government will initially concentrate on Primary Rate Interface (PRI) applications, he said, since PRI is available from long-distance carriers and provides at least two of the major features government users want: automatic number identification and dynamic allocation of channels. ■

Carrier Watch

continued from page 13

of which was not disclosed, is expected to be completed in 30 to 60 days, according to an SP Telecom spokesman.

Digital Signal leases bulk capacity on major carriers' fiber networks and resells capacity in smaller increments as digital private-line services between 88 East Coast cities. SP Telecom operates a 2,200-mile fiber net stretching from Houston to San Francisco. The carrier sells T-1 and T-3 services to users and other carriers.

Tekelec, Inc., a Calabasas, Calif.-based test equipment vendor, recently signed an agreement to provide British Telecommunications PLC with \$500,000 of its Chameleon 20-I test sets over the next year. The Chameleons will be used to test Digital Assignment Signaling and Switching II, a set of ISDN Primary Rate Interface-like private branch exchange-to-network signaling protocols used in the U.K. A Tekelec spokesman said that more than 50% of the firm's 1989 sales resulted from international business. The test equipment vendor has subsidiaries in the U.K. and Japan. ■

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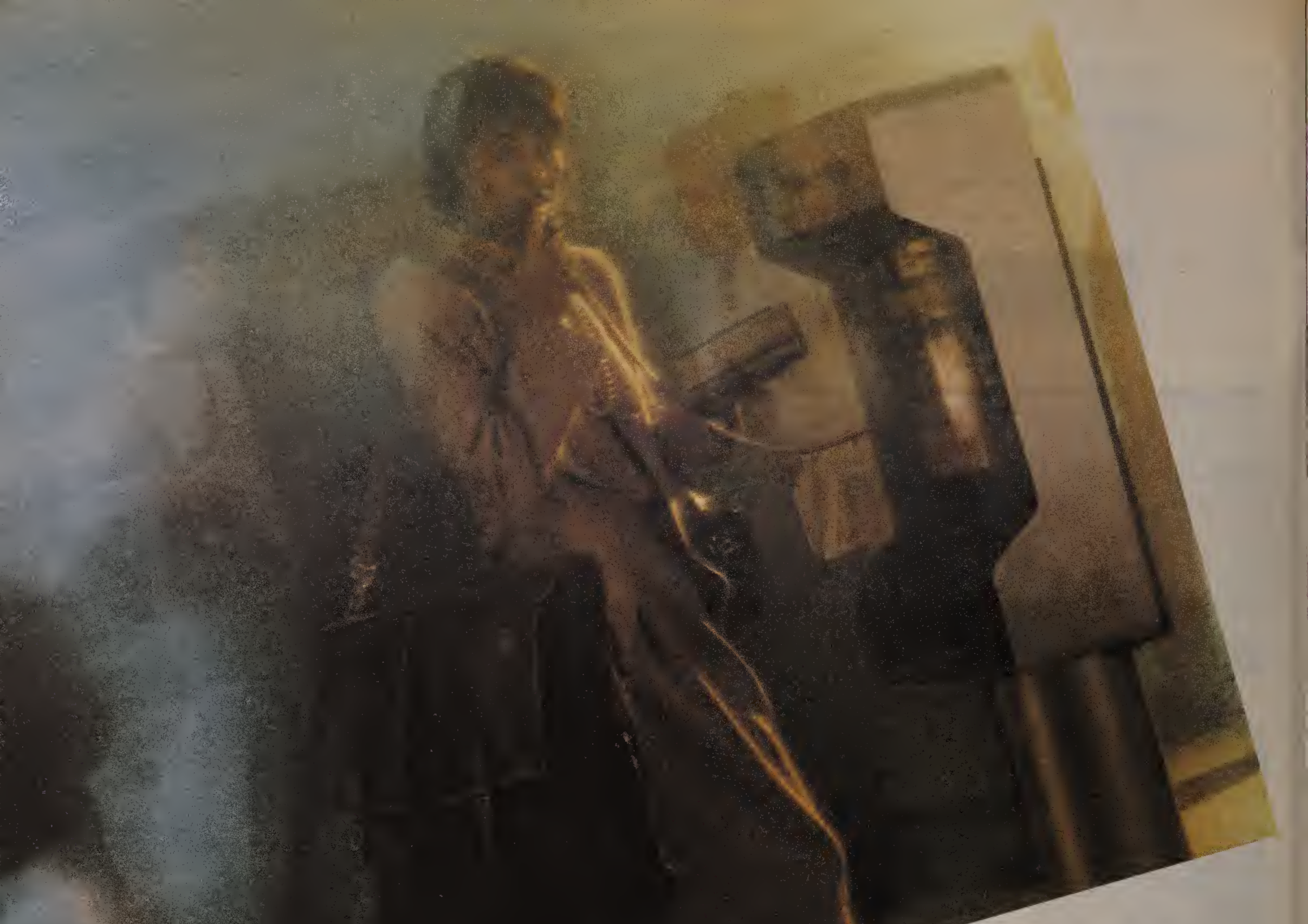
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Worth Noting

“Isn't it amazing that the [computer reservation system] — the technology and the network — has been the most interesting chess piece in a lot of these airline mergers and acquisitions — not the fleets, not the airplanes, not the pilots, none of those things.”

Mark Teflian
Vice-president and
chief information
officer
Covia Partnership
Rosemont, Ill.

New cluster controllers support various host links

Concert line links to IBM and DEC processors.

By Paul Desmond
Senior Writer

TEMPE, Ariz. — IDEA Courier, Inc. last week announced a series of cluster controllers that support concurrent terminal links to IBM mainframe and mid-range computers, as well as to Digital Equipment Corp. VAXes.

The new Concert controllers eliminate the need for separate controllers dedicated to each of the three types of hosts supported. It also lets a terminal designed for one type of host access a different type, such as an IBM 3270 linking to a DEC VAX.

Until now, IDEA Courier has been a supplier of terminals, controllers and printers for IBM System/370 mainframes, but the announcement of the Concert line signals its effort to become a supplier of connectivity products for multivendor environments, said

Nora Gildea, vice-president of sales and marketing.

The company's Concert controllers are based on a modular architecture that lets users add adapter boards and software as their needs dictate.

Separate boards let users forge links from the controller to IBM System/370 mainframes, Application System/400 or System/3X minicomputers and DEC VAXes or MicroVAXes. The controllers support asynchronous links to hosts from other vendors.

The Concert controllers beat out IBM's 3174 controllers in their support for multiple hosts and in the number of terminals supported, said Suzanne Harbster, product manager for the new controllers.

IDEA Courier's new high-end controller, the Concert 10500, (continued on page 18)

GDC signs modem, service agreements with carriers

By Paul Desmond
Senior Writer

OTTAWA — Telecom Canada, the association of Canada's major telecommunications carriers, recently signed a three-year agreement for modem products with General DataComm, Ltd. worth an estimated \$54 million.

Under the agreement, General DataComm, Ltd., a subsidiary of Middlebury, Conn.-based General DataComm Industries, Inc., will supply a full line of modems ranging in speed from 300 to 9.6K bit/sec. Telecom Canada member companies will lease the modems to their customers and use them in their own internal data networks.

Telecom Canada is an umbrella administrative association comprised of Canadian telephone companies.

The contract extends a similar two-year agreement with General DataComm Industries signed in 1988. That deal was worth about \$36 million.

General DataComm Industries also announced it has signed a three-year service agreement with Southwestern Bell Telecommunications, Inc. to support General DataComm Industries modems, data service units, channel service units and network management equipment sold by the carrier's Business Systems Division.

Under the terms of that agreement, General DataComm Industries' subsidiary, DataComm Service Corp. (DSC), will install and maintain the full range of General DataComm Industries products and will provide training and technical support to Southwestern Bell Telecom personnel.

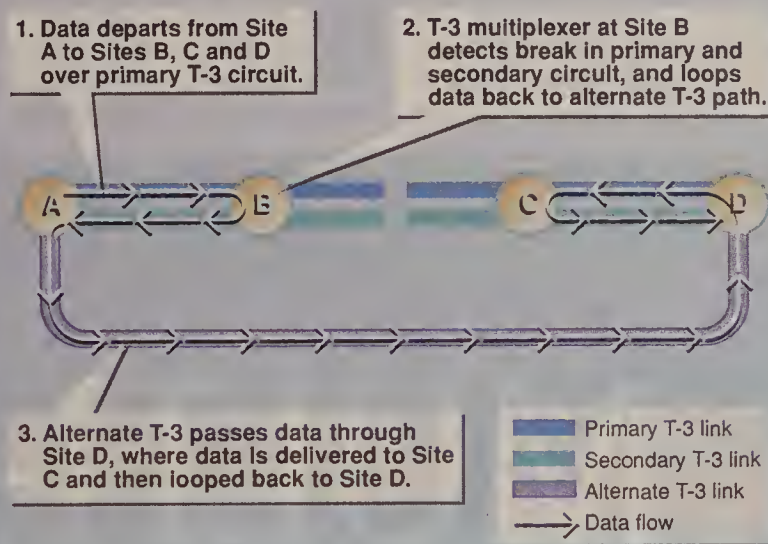
Within Southwestern Bell's operating territory, both the carrier and DSC may service end users directly. Outside that territory, DSC will provide end-user support directly, including for international networks.

Southwestern Bell is the first carrier to become a member of General DataComm Industries' Service Partners Program, under which the company provides service and support to resellers of its products and, through agreements with those resellers, directly to users.

The deal with General DataComm Industries is part of Southwestern Bell's push to provide data communications equipment and service, said Gerald Hammon, regional manager for the carrier's operations staff.

“This allows us to take on larger systems and be more aggressive in selling data equipment. We'll be able to sell nationwide,” Hammon said. “We see it as a forerunner of bigger and better things on down the pike,” including managing user nets. ■

Infotron's reverse-protection ring



Infotron adopts T-3 flexible routing plan

Multiplexer maker builds reverse-protection ring feature into Streamline 45s for alternate routing.

By Jim Brown
Senior Editor

DALLAS — Infotron Systems Corp. recently introduced a feature that will enable its Streamline 45 T-3 multiplexers configured in a ring topology to support alternate routing.

Introduced here at Interface '90 Plus, the reverse-protection ring feature added to Streamline 45 automatically routes data over spare T-3 circuits when a primary circuit fails. Previously, the Streamline 45 had no alternate routing capability.

However, analysts say the feature does not provide the type of flexible alternate routing available in T-1 multiplexers configured in mesh networks.

The routing feature consists of an enhanced processor board and new T-3 interface boards that reside in the Streamline 45. The boards work together to detect a cable break and switch data from one T-3 interface board to another.

The feature was developed by Infotron's Licom, Inc. subsidiary and was already available on Licom's IMX30 T-3 multiplexer, which is primarily sold to carriers. The Streamline 45 is a customized version of Licom's IMX30 and is aimed at the end-user market.

The feature will support up to 16 Streamline 45s linked together via primary and spare T-3 circuits that follow the same geographical path. The first and last multiplexers in the chain are interconnected via an alternate T-3 link that takes a different geographical path, thus closing the loop.

For example, a four-node

Streamline 45 network consists of multiplexers at Sites A, B, C and D that are linked via primary and spare T-3 circuits that follow the same geographical path. The multiplexers at Sites A and D are additionally linked via an alternate T-3 circuit taking a separate path (see graphic, this page).

A break in the primary and spare circuits, which are typically located in the same conduit, between Sites B and C will force the multiplexer at Site B to reroute data over the spare T-3 to Site A. Site A will then pass the traffic over the alternate T-3 link to Site D. The multiplexer at Site D then transmits the data over the spare

“Infotron had to ensure users they will have high reliability on high-capacity T-3 nets.”

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T-3 link to Site C.

Using Streamline 45's drop-and-insert capability, the multiplexer at Site C will extract data destined for that site from the T-3 data stream and insert data being sent to other sites. That T-3 data stream is then passed over the primary circuit back to Site D.

“This is something Infotron had to do to ensure users they will have high reliability on high-capacity T-3 networks,” said Mark LaRow, a senior manager with Ernst & Young's Network Strategy (continued on page 18)

Data Packets

TelWatch, Inc. of Boulder, Colo., recently announced plans to develop an interface between its NetExec Unix-based network management system and AT&T's Accumaster Integrator.

NetExec, currently in beta test at several locations, promises to provide integrated management of multivendor physical networks. The Accumaster Integrator link would let NetExec pass data from proprietary net management systems, including TelWatch's NetWatch system, to the Accumaster Integrator using Open Systems Interconnection-based protocols.

NetExec is due out in the second quarter. The Accumaster Integrator link is due out in the second half of this year.

Infotron Systems Corp. recently enhanced its Integrated Network Management (INM) system to enable INM users to monitor and control Infotron's Streamline 45 T-3 multiplexers.

The enhancements enable INM users to manage Streamline 45s and other Infotron products from the same workstation. ■

Infotron adopts T-3 routing plan

continued from page 17

gies, Inc., a Fairfax, Va.-based consulting firm.

However, LaRow said, the feature falls short of what users are seeking in T-3 multiplexers. For instance, users want to build mesh networks that support more flexible alternate routing

around failed circuits.

In a mesh network, each multiplexer is connected to two or more other multiplexers. When a link failure occurs in a mesh network, the T-3 multiplexer will route the 28 T-1 data streams that comprise a T-3 link to spare capacity on other T-3 links in the network. This process takes several seconds to accomplish and requires the T-3 multiplexer to

support large amounts of processing power, LaRow said.

The Streamline 45 cannot yet do this type of alternate routing. "What Infotron is doing is putting good light on a limitation to its product," LaRow said.

Since the Streamline 45 re-routes entire T-3 data streams over spare T-3 circuits, it can re-route traffic faster and does not require large amounts of process-

ing power, said Dave Eckel, manager of sales support for Licom.

The reverse-protection ring may provide enough alternate routing for small T-3 networks, analysts said. "A ring will handle up to six nodes pretty smoothly," said Steve Taylor, president of Distributed Networking Associates, a Greensboro, N.C.-based telecommunications consulting firm. "But once you go beyond

that number of nodes, you need something that has the capability of supporting a mesh or some other type of slightly more robust topology."

Streamline 45s equipped with the reverse-protection ring feature range in price from \$25,000 to \$50,000. It costs between \$10,000 and \$20,000 to add the feature to existing Streamline 45s. ▣

New cluster controllers

continued from page 17

supports up to 54 3270 devices, 56 IBM 5250 mid-range terminals, 54 terminals supporting DEC's Local Area Transport (LAT) protocol or 32 asynchronous devices. It supports any combination of terminal types in various numbers. The high-end IBM 3174s support as many as 32 3270 and 24 asynchronous ports ("IBM overhauls 3174, broadens 3745 line," *NW*, May 8, 1989).

The low-end Concert 10300 supports as many as 18 3270 devices, 14 5250s, 16 asynchronous terminals or 18 DEC LAT devices, plus one host connection and one token-ring gateway. The mid-range Concert 10400 supports up to 32 3270s, 28 5250s, 32 asynchronous or 54 DEC LAT devices plus two host and two token-ring connections.

There is no technical limit to the number of host sessions a single controller can support, Harbster said. Each controller can be configured as multiple physical units and each physical unit supports 256 devices.

Token-ring interfaces are supported, as are Ethernet links, for communicating with DEC VAX hosts using DEC's LAT protocol. Additionally, the Concert controller can let a VT-220 terminal display multiple VAX sessions in split-screen mode.

A Concert controller configured as a token-ring gateway can support attached terminals, whereas a 3174 used as a token-ring gateway is typically dedicated to that task, Harbster said.

A terminal user can hot-key between sessions on up to four different hosts in a split-screen mode, she said. In addition, users can copy data from one application and paste it into another, regardless of where the applications are running, she said. The controller places ASCII or EBCDIC text from one screen into a buffer and, when the user hits the enter key, the text is entered into the host for the receiving application as if the user had typed it.

Typical Concert configurations range in price from about \$3,295 to more than \$10,000.

The Concert 10300 and 10400 with 3174 support are available now, and the Model 10500 is expected to be available next month. Support for 5250 devices on all three models should be available in May. ▣

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Worth Noting

“One of the things I told the IEEE 802 Committee Project when I addressed the group last week is that they should disband. The last thing we need is more standards. The best advice I can give them is ‘Go home, you’ve done your job.’”

Bob Metcalfe
3Com Corp. founder and
coinventor of IEEE 802.3
Ethernet standard

Netnotes

Tri-Data Systems, Inc. recently announced what it is billing as the first variable-speed 16M/4M bit/sec token-ring adapters for Apple Computer, Inc.’s Macintosh microcomputer. Scheduled for release next month, the LanWay TR 16/4 line consists of two boards: one for the NuBus in the Macintosh II line and another for Macintosh SE systems based on the Motorola, Inc. 68030 microprocessors.

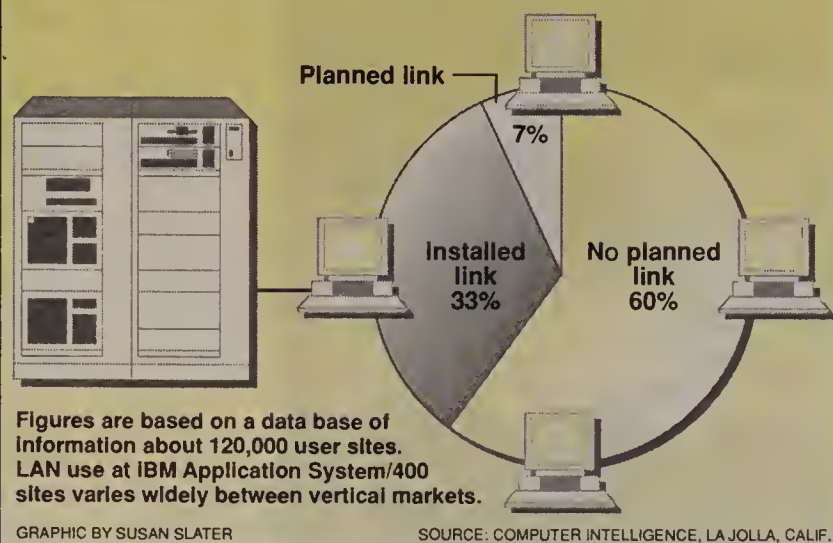
The adapters incorporate the Texas Instruments, Inc. TMS380C16 token-ring processor, which was developed in conjunction with IBM to assure compatibility with IBM’s variable-speed 16M/4M bit/sec token-ring products.

Ransome Williams, sales manager for Tri-Data Systems, said the boards were developed in response to customer demand for token-ring products for the Macintosh.

Both the NuBus LanWay TR 16/4 and the LANWay TR 16/4 SE/030 have 128Kbytes of on-board memory for supporting multiple transmit and receive operations. They are also compatible with Apple’s TokenTalk standard.

The boards cost \$1,095 each. For more information, contact Tri-Data Systems at 3270 Scott Blvd., Santa Clara, Calif. 95054, or call (408) 727-3270. ■

AS/400 use on LANs



IBM AS/400 minis finding homes on local networks

Study says client/server computing is driving trend.

By Walter Sweet
West Coast Correspondent

LA JOLLA, Calif. — IBM’s Application System/400 is gaining popularity as a device to be tied to local-area networks and is expected to quickly surpass the System/38 as the IBM minicomputer of choice for LAN environments, according to a recent study by Computer Intelligence.

The move to integrate AS/400s into LANs should be accelerated by industry adoption of client/server architectures, according to David Eulitt, an industry analyst for Computer Intelligence here. AS/400s are also the obvious choice for use on LANs because they are the easiest IBM mid-range computers to network, he said.

The study, titled “LAN Use at AS/400 Sites,” stated that about one-third of the installed AS/400s are now supported on LANs and another 7% of AS/400 users said they will have such a link within the next year.

“As the client/server architecture takes off, users are going to want to use the LAN as the connection method between the host-based system and personal computers,” Eulitt said.

As more LANs are connected to AS/400s, software vendors will rewrite their applications to support client/server relationships, with the AS/400 supporting, for example, data base applications that client workstations can share.

According to the study, which was based on the company’s data base concerning the computing resources of 120,000 users, 19% of System/38s and 18% of AS/400s are supported on LANs. Only 7% of System/34 and 8% of System/36 users link the machines to LANs.

Although they are very close, AS/400-to-LAN connections are

expected to surpass System/38-to-LAN connections in part because users can link LANs to an AS/400 easier than any other IBM mid-range computer.

The study found AS/400 use on LANs varies widely among industries, with almost 30% of the AS/400 users in the medical and education fields supporting LANs, compared to only 8% in the wholesale and retail areas.

Other industries, including manufacturing, banking and agriculture, each have more than 20% of their AS/400s hooked up to LANs. According to the study,

The study found AS/400 use on LANs varies widely among industries.

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11% of the older AS/400 Model 10s support LANs, compared to 43% of the newer, more powerful Model 70s.

Among those users contemplating integrating the environments is Angeles Corp., a multi-billion dollar syndication firm. The company said it may link its LAN, which supports 100 personal computers, to its AS/400 by the end of the year.

According to Bill Leonard, vice-president of MIS at Angeles, hooking the LAN to its AS/400 is a natural progression toward letting users access the minicomputer’s data base and other applications. After the host and LAN are linked, Leonard said the company might tie in another 100 remote computers around the country. ■

Fibronics on course with FDDI strategy

After surviving tough times, R&D gamble on FDDI begins to pay dividends; revenues are up 21%.

By Laura DiDio
Senior Editor

HYANNIS, Mass. — After several shaky years, executives at Fibronics International, Inc. have something to smile about. The company’s recent financials are the best in its 13-year history, and it is well positioned for growth in the blossoming Fiber Distributed Data Interface (FDDI) market.

Fibronics, a manufacturer of fiber-optic data communications equipment, last year posted revenue of \$49 million, up 21% from \$40.5 million in 1988. Company earnings almost tripled, growing from \$901,000 in 1988 to nearly \$2.5 million in 1989.

Fibronics executives acknowledge that the company’s financial results won’t bowl anyone over, but they say the figures, coupled with the company’s array of 100M bit/sec FDDI products, are indicative of Fibronics’ potential.

“We’ve finally got all the pieces in place,” said Hal Spurney, Fibronics’ director of marketing. “Things were pretty grim for a while, but our System Finex FDDI line, which accounted for 15% of our revenue in ’89, is on a steep growth ramp, and we’ve

posted several consecutive profitable quarters. We think we’ve turned the corner.”

Old woes

Two years ago, the picture wasn’t so bright. The company was reeling from two years of consecutive losses, and much of its revenue was being reinvested into FDDI product development efforts.

To slash operating expenses, John Hale, newly installed president at that time, removed 81 employees and external contractors from its payroll while senior executives agreed to a 10% pay cut.

But Fibronics’ gamble on FDDI is beginning to pay off. The company is the acknowledged market leader in the fledgling FDDI arena and has led the market in pushing FDDI prices down.

Fibronics currently has five products in its System Finex FDDI family:

- The FX8210 Ethernet-to-FDDI Learning Bridge, which makes it possible to link multiple Ethernets through an FDDI backbone.
- The FX8222 Channel Attached Controller, a device that enables IBM System/370 mainframes to

(continued on page 21)

Interlink stakes its claim to bridge/router market

By Susan Breidenbach
West Coast Bureau Chief

FREMONT, Calif. — VAX-to-mainframe gateway specialist Interlink Computer Sciences, Inc. last week moved into the bridge and router markets with the introduction of three aggressively priced products.

The products, a bridge and two bridge/routers, are designed to connect remote Ethernet local-area networks to LANs or wide-area networks. They were unveiled along with a network management system based on the Simple Network Management Protocol (SNMP).

“We want to leverage our position as a premier SNA gateway company and offer our customers one-stop shopping for their inter-networking needs,” said Andrew Henderson, sales manager for LAN technologies at Interlink, an IBM business partner.

At the low end of the new

product line is the Software Network Solution (SNS)/B320, a bridge that can be used to link dispersed Ethernets transparently into a single extended LAN. The bridge operates at the media access control layer so it can connect LANs that are running incompatible network protocols, such as Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.’s DECnet, Xerox Corp.’s Xerox Network Systems or Novell, Inc.’s Inter-network Packet Exchange (IPX).

However, the SNS/B320 also has a “protocol precedence” feature that facilitates the movement of time-sensitive protocols, such as DEC’s Local Area Transport, across large-scale WANs. When this feature is activated, the bridge checks packets for such protocols and prioritizes the order of packet transmission accordingly.

(continued on page 21)



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Fibronics on course with FDDI strategy

continued from page 19

be bridged at channel speeds to an FDDI backbone.

■ The FX8310 FDDI IP Router, a device used to route Transmission Control Protocol/Internet Protocol traffic.

■ The FX8322 Mainframe Channel Attached Network Controller, a unit that routes IBM System/370, 43XX and 30XX mainframe traffic across an FDDI backbone to Ethernet and token-ring local-area networks.

■ The FX8510 Network Management System, personal computer network management software that enables net administrators to diagnose and monitor FDDI nets.

Both Spurney and Joe Garodnick, the corporate vice-president who is the architect behind much of the company's technology, admit that Fibronics' current sales increases are due in large part to the fact that it is one of only a handful of vendors shipping product.

But sales have also benefited from the fact that FDDI prices have dropped several orders of magnitude in just three years due to the availability for manufacturing of Advanced Micro Devices, Inc.'s Supernet chipset and Fibronics' own improved economies of scale, they said.

The price of Fibronics' FDDI bridge has

plummeted from \$250,000 in 1987 for its original System Finex FDDI bridge to \$12,600 for the System Finex FX8210 Ethernet-to-FDDI Learning Bridge.

Fibronics' current base of more than 50 FDDI users leads the industry and includes such Fortune 500 firms as Control Data Corp., Coors Brewing Co., Martin Marietta Corp., NASA Langley Research Center and Unisys Corp., Spurney noted. That roster is expected to grow to 200 users within the next 18 months, Garodnick said.

Users give Fibronics generally high marks for quality, reliability and responsiveness to customers.

Yi Tung, an aerospace technologist at NASA Langley in Hampton, Va., has installed two Fibronics System Finex FX8210 bridges on an FDDI test network. "We

chose Fibronics because they have the first commercially available products and they also gave us the value-added filtering capability," Tung said.

Most other FDDI bridge offerings, he explained, are transparent. That is, they pass all data packets across the backbone. By contrast, Fibronics System Finex bridges filter data packets, enabling network administrators to control the data flow through various subnets.

"This means that our networks won't get bogged down with unnecessary data traffic," Tung said. "So far, in about four months of using the Fibronics FDDI bridges in our test networks, we're happy with the performance."

The biggest concern facing Fibronics is that it no longer has the FDDI market to

itself. At least two dozen vendors, including IBM and Digital Equipment Corp., are readying FDDI offerings.

In order for Fibronics to continue to succeed in the face of stiff competition, it has to differentiate itself.

Spurney said Fibronics' marketing plan calls for it to compete on value-added capabilities such as data flow control, a feature normally found only on routers. "We also intend to leave the business of selling FDDI adapters to the workstation and system vendors," Spurney said.

"Undoubtedly, we'll lose business to the large systems suppliers," he concluded. "But we're confident we'll still get a good portion of the FDDI business since we've got the edge in engineering expertise and we were the first to market." ■

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10BaseT compliant?	✓	✓	No	✓
Multiple segments and rings in same hub?	✓	No	No	No
Ethernet, Token Ring and IBM 5250 in same hub?	✓	No	No	✓
Full redundancy?	✓	No	No	No
SNMP based Network Management?	✓	✓	✓	No
FDDI shipping now?	✓	No	No	✓
Typical price per port (with network management)	\$364-\$701	\$454-\$883	\$574-\$1569	\$990-\$2200

If enterprise networking is your charter, then you expect to install serious solutions. That's why Fibermux designed Crossbow with sophisticated features not found in other products. Features that facilitate building and managing enterprise workstation networks.

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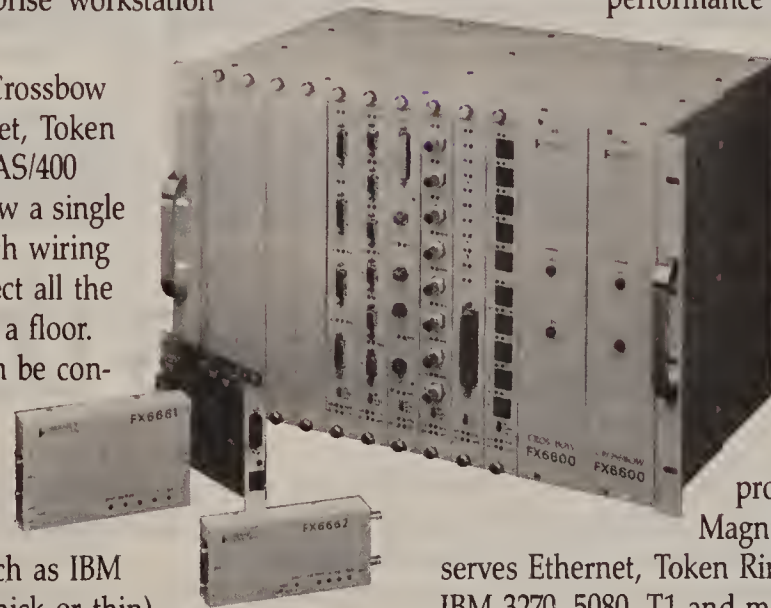
Large networks like these need powerful

management functions. Crossbow Lightwatch is based on SNMP. Besides the monitoring and diagnostic features you'd expect, Lightwatch provides traffic-loading "what if" tests to help optimize your workstation network for best performance and future growth.

Speaking of the future, Fibermux is shipping 10BaseT compliant Ethernet products today. Instead of chasing the standard, install it! Crossbow is also ready now to work with Fibermux FDDI products and our popular Magnum backbone which

serves Ethernet, Token Ring (4 and 16 Mbps), IBM 3270, 5080, T1 and most other popular workstations.

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See us at CeBIT in Hall 23, booth #C13/1. (IPS)

Interlink stakes its claim to router mart

continued from page 19

The bridge implements the IEEE 802.1 Spanning Tree Algorithm to solve the problem of loops in complex internetworks, selecting the best possible data path and disabling others.

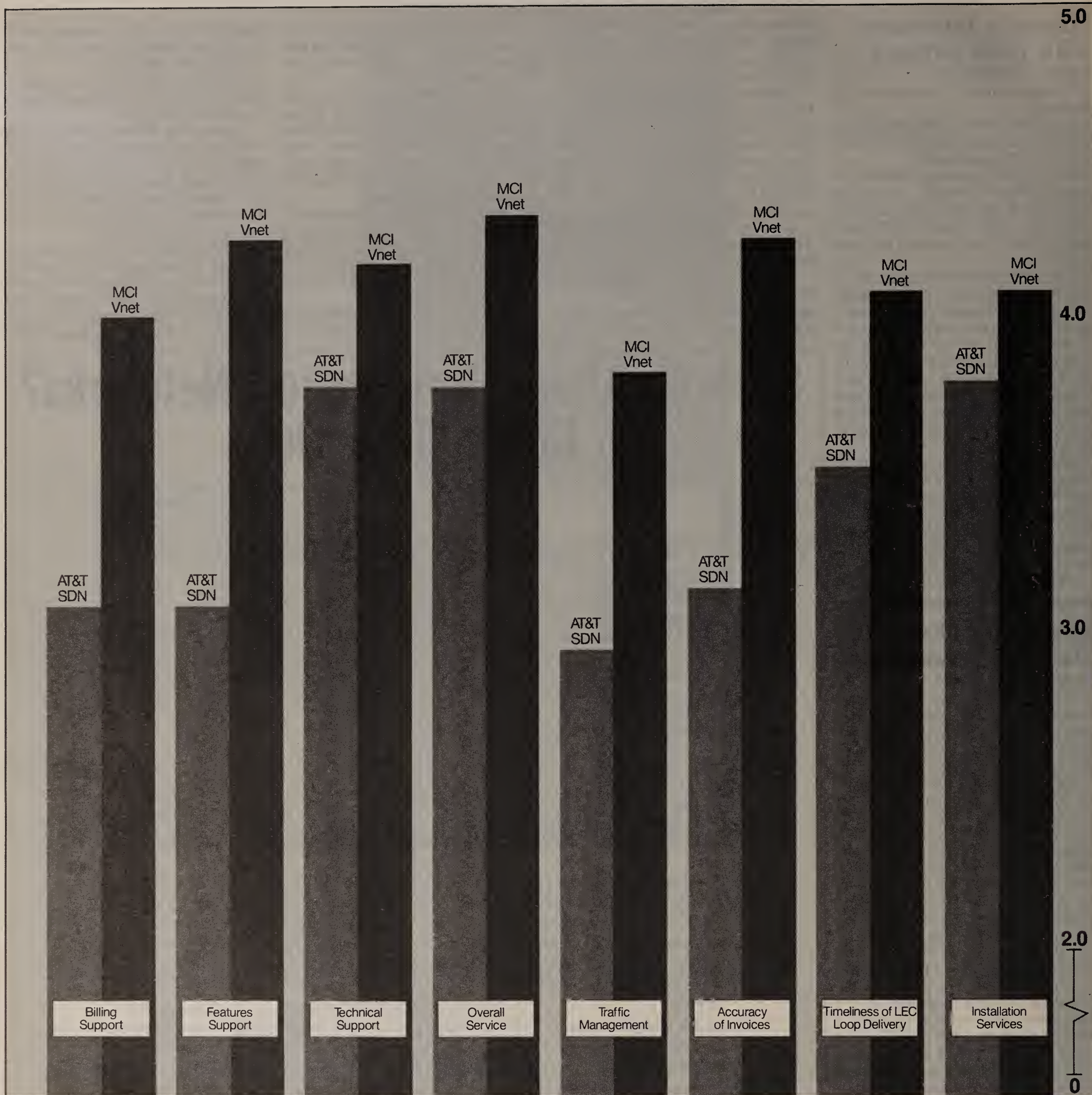
The next step up the product ladder is the SNS/BR340, a router that routes DECnet or TCP/IP packets, and bridges everything else. When functioning as a bridge, it has all the features of the SNS/B320. But the SNS/BR340 also has IP routing software that lets users configure the device to bridge across links where protocol transparency is the priority and to route packets where path control is critical. The SNS/B320 and SNS/BR340 are based on Interlink's LAN 1000 hardware.

Interlink's third new product is the SNS/BR380, which is designed to act as a hub connecting several central hosts to a number of remote LANs or WANs. It is based on the company's eight-port LAN 1020 hardware, which is actually four LAN 1000s rack-mounted in a single chassis.

The SNS/BR380 has all the features of the SNS/B320 and SNS/BR340, and can be connected to both of them remotely. All three internetworking products can function as SNMP agents.

To manage them and other vendors' SNMP-supporting devices, Interlink also introduced the SNS/SNMPconnect, a network management system based on Sun Microsystems, Inc.'s SPARCstation. The SNS/SNMPconnect system polls SNMP agents scattered across a complex TCP/IP WAN and provides network administrators with real-time statistics on performance.

The SNS/B320 is priced at \$6,950, the SNS/BR340 costs \$8,400, and an eight-port SNS/BR380 costs \$22,960. The SNMPconnect system, excluding the SPARCstation, is priced at \$11,000. All the products are available now, and DECnet Level 2 routing will be available in May as an enhancement to the routers. ■



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Dialogue

Some observers say Integrated Services Digital Networks will be obsolete by the time it's implemented because it won't offer the bandwidth needed to support future applications. Do you agree?

"I agree with that. I don't think ISDN's going to be ready to run before it's out of date. It's just taking so long to implement it. I think fractional T-1 is probably the way to go, but that is a long way off also. T-1 is definitely a tried-and-true method, and fractional T-1 would be a good solution to bandwidth problems."

Burton Torrens

Director of MIS
Mount Clemens
General Hospital
Mount Clemens, Mich.

"I agree and disagree. I think there will be applications that require much greater bandwidth than ISDN can provide, and there are other solutions that have been developed to handle that."

"But at the same time, there are many applications that can be handled within the ISDN bandwidth capabilities, like automatic number identification."

Bill Hegge

Telcommunications manager
Northwestern Mutual
Life Insurance Co.
Milwaukee

"Yes I do. Major companies are not pushing for its completion because the bandwidth is lacking for things like videoconferencing."

"I think there was too much foot-dragging in setting standards for one thing, and other technologies have begun to catch up."

"Everybody was talking about ISDN because it was something new on the block — with the integration of voice and data and all — but they really couldn't get together on how to provide what people are going to need."

"I think the concept is good, but it got stirred too long. They didn't come right out and do it. They've been talking about ISDN for five years and there is still no 100% ISDN solution."

Walter Garner Jr.

Vice-president of
communications
Sunburst Bank
Grenada, Miss.

Planning, consistency are key to sound project mgmt.

Network managers discuss successes, failures.

By Wayne Eckerson
Senior Writer

The careers and reputations of network managers are often made or broken by their ability to complete network projects on time and within budget.

But for many network executives, project management is a black art that becomes more difficult to master as the complexity and scope of projects increase. While there are many software packages available today that can help managers keep track of projects, most network managers say basic management skills are the critical ingredient for making sure network projects go off smoothly.

Network managers interviewed by *Network World* emphasized the importance of breaking large projects down into manageable parts and communicating regularly with key staff members to catch problems before they mushroom into crises. They also said that managers must be consistent and apply the same methods or tools throughout the duration of a project.

"The big problem with project

management is that people set up procedures for managing projects and then let them fall by the wayside the further they get into it," said Len Evenchik, director of communications for the Commonwealth of Massachusetts. "It doesn't matter what procedures or software tools network managers employ, just as long as they use them consistently throughout the life cycle of a project."

DuWayne Peterson, executive vice-president at Merrill Lynch & Co., said one major project at his company ran into serious problems because top managers didn't maintain close communication with the project team and the project wasn't broken down into manageable parts. The project, which is currently behind schedule, involves updating software used in the firm's accounts processing system, which Peterson said is a backbone system for the company.

"The project started getting away from us because we strayed from the basics of having regular morning meetings," he said.

Disciplined communication is
(continued on page 24)

EXECUTIVE BRIEFS

EDI spread the word! salary survey. Preliminary results from the first-ever survey of electronic data interchange coordinators showed that in large sales or customer service departments, EDI professionals earn up to \$93,000 annually.

The survey, conducted at the annual EDI Systems Conference & Exhibit in Dallas last month, showed a wide range of job titles and compensation for EDI professionals.

Results of the survey indicate that EDI coordinators, analysts or project leaders earn an average of \$48,418, while programmers or others with technical data processing titles earn \$32,136 on average. Software house and third-party network employees who market services to EDI coordinators earn more, with sales personnel earning an average of \$63,698 in salary and incentives, and managers and executives earning about \$69,257.

HL7 development. Officials of the Health Level 7 (HL7) Working Group announced at a recent health care conference that they will soon begin certifying vendor products for conformance to HL7 standards.

Sam Schultz, associate executive director of information management for the Hospital of the University of Pennsylvania and one of the founders of the HL7 Working Group, said that while most of the details of the certification program have yet to be worked out, he expects the program to begin some time this fall.

"Certification is an important step in the development of the [HL7] standard," Schultz said. "It will enable consumers to determine whether HL7 products sold by vendors are indeed compatible with HL7 specifications." ■

A network employee performance review primer

- ✓ Use quantifiable performance goals when possible.
- ✓ Base review on current, clear job description.
- ✓ Minimum two reviews per year.
- ✓ Only review performance within employee control.
- ✓ Maintain open dialogue on shifting responsibilities.
- ✓ Tie performance directly to pay.

SOURCE: WILLIAM M. MERCER MEIDINGER HANSEN, DALLAS
GRAPHIC BY SUSAN SLATER



Performance review critical in net arena

Regular reviews of job performance can help network managers stave off employee burnout.

By Joe Panepinto
Staff Writer

Regularly scheduled performance reviews can be a powerful tool for network managers working to keep harried net personnel on track and improve communications within the department.

According to organizational and personnel professionals, savvy network executives use performance reviews to maintain individual and departmental focus and to reduce overall stress in the workplace.

"A big temptation that pulls at people is to ride off in different directions," said Bruce Sanders, a network consultant and organizational psychologist in Vacaville, Calif. "The sign of a good manager is the ability to maintain departmental focus through regular reviews."

Most net managers use a combination of quantitative evaluation forms and annual goal-setting interviews to measure and monitor job performance.

According to Debbie Thobe and Lee Colan, human resources principals at the consultancy William M. Mercer Meidinger Hansen, Inc., all good performance reviews begin with a complete, up-to-date job description.

But keeping up-to-date in the information systems industry is no easy feat. "Rapid advancements in network technology mean jobs flow and evolve," Thobe said. "There are those who have to rewrite a job description every three months [because] new system configurations change job responsibilities."

Trying to keep up with major job changes can be an onerous task — one that could overburden already stressed employees and managers. But Thobe and Colan suggest that even informal notifications and reviews of shifts

in job responsibility and performance are valuable.

As a general guideline, Thobe and Colan recommend holding two formal performance review meetings per year. They recommend that managers give employees measurable goals and ensure that employees have the authority and skills to achieve the agreed-upon goals.

"Aiming at 85% for the overall throughput of a network system is an appropriate goal for a network manager, but not necessarily for a network technician," Thobe said. "A technician probably wouldn't have the authority to ensure overall throughput."

Pay for performance

Both Thobe and Colan recommend tying performance directly to pay. They suggest managers use quantifiable performance measures when possible but keep the process flexible because changing goals need constant fine-tuning and monitoring.

Sanders also recommends that managers hold regular informal meetings with network personnel to evaluate performance. Because so many of the qualities of an outstanding network employee are qualitative, such as in-group and end-user communication, it would be unfair to boil those talents down to a single item on a structured performance review questionnaire, he said.

"There needs to be some structure," Sanders said, "but that's a formality. That's the auditing part. Performance reviews should actually be an ongoing collaboration."

Some companies pay particular attention to quantitative measures. "We try to quantify everything," said Paul Conrow, director of communications and
(continued on page 24)

Planning is key to project mgmt.

continued from page 23

necessary to support rapid decision making and to keep problems from getting out of control, he added.

But other network executives said too many meetings in the early phases of a project, such as a large network cutover, can undermine the authority and initiative of a project manager.

"It's important to let project managers exercise entrepreneurial freedom and feel they have total authority over a project," said Bill Pomeroy, director of telecommunications and public policy for the International Communications Association and a former senior telecommunications

manager at General Electric Corp.

To foster project ownership, Pomeroy said he gave one manager complete responsibility for a project. He also made it a point to meet only once a month with the project manager in the early phases of the project. However, as the project or cutover deadline approached, he would meet weekly and sometimes daily to review schedules and budgets and resolve any last-minute problems.

But other managers said getting key people together in one place at the same time is almost impossible, especially when these people might be scattered across the globe.

Stanley Welland, manager of corporate telecommunications at General Electric Co. in Bridgeport, Conn., said he and his

staff rely primarily on voice messaging to stay in touch and review the progress of projects. "I like to stay on top of everything, but trying to coordinate schedules so everyone can meet is impossible," he said. "Voice messaging enables us to communicate 24 hours a day, seven days a week. We haven't held a formal staff meeting in well over six months."

Welland said voice messaging has helped him stay on top of a current network expansion project the company is undertaking in the Pacific Rim. GE staffers there can call in and leave or retrieve messages from Welland any time of the day.

"We'd be dead in the water without voice messaging," Welland said.

While managers said they believe project management software is no panacea,

the products help them keep track of the myriad project details and make weekly meetings more productive and efficient.

Certified Grocers of California, Ltd., a grocery distribution company in Los Angeles, has used project management software to facilitate seven major network cutovers the company has completed in the past two years. The software provides regular status reports on schedules, budgets and personnel assignments, which the project team reviews at weekly meetings.

The company updates the program daily. People who have been assigned to a project submit a time sheet each day with the number of hours they worked on a specific task. A clerical worker then keys in the information to the program, which uses the information to generate new schedules and a variety of reports for project managers and senior executives.

According to Michael Marks, a communications supervisor for the firm, the software keeps track of all the details that were often overlooked previously.

"The software doesn't let you forget [any of the details]," he said. ■

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Performance review critical in net arena

continued from page 23

engineering operations for Fireman's Fund Insurance Co. "Goals don't mean much if you don't quantify them."

For example, local-area network managers may wish to reduce downtime by a certain percentage, or network managers may aim at reducing their budget a similar amount, Conrow said.

All goals are recorded in a yearly meeting and then adjusted in quarterly meetings, with employee performance in each category given a rating between one and five — one for a poor performance and five for exceeding goals.

"I think stress and burnout are reactions to the unknown," said Conrow, who manages a department split into three project areas: voice engineering, data engineering and network services. "The fewer unknowns, the less temperate the environment becomes."

At Fireman's Fund Insurance, performance reviews are tied directly to bonuses and base pay increases.

In contrast, Hartmarx Specialty Stores, Inc., the Chicago-based parent of the national retail store chain, uses a more qualitative format in its performance reviews.

The form presents open-ended questions about performance goals that are then reviewed in an annual meeting.

Jim Beattie, director of telecommunications for Hartmarx, said annual performance review meetings at the company are generally constructive, but problems do arise. For example, in some cases, qualitative performance reviews can further unravel already frayed relationships.

"It depends on the manager and employee working on it together," he said. "You get good marriages and others that are a little strained. It depends on what the relationship was to start with."

Overall, net managers should realize the importance of having some structured performance review process, for the good of the employees and the department.

"If you wing it, you'll probably end up spending too much money in your organization with people forming their own little empires," Conrow said. "You'll also become an event-driven organization blown by individual market changes." ■

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USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

“**P**rivacy will become an issue of paramount importance in Europe, just as it is now in the U.S. We must find a way to deal with such things as automatic caller identification so we don't lose public support for [new] digital network technology.”

Herbert Ungerer
Division head
Directorate General XIII
European Commission
Brussels, Belgium

Breaking up NTT

New companies recommended by Japan's Telecommunications Council*:

Company	Date created by	Services inherited
Long-distance carrier	1995	Long-distance services
Local carrier	1997	Local loop services, network research
Mobile communications carrier	1997	Cellular mobile telephone

*An advisory arm of the Ministry of Posts and Telecommunications.

Groups opposing this plan:

- ☐ The Economic Planning Agency
- ☐ The Federation of Economic Organizations
- ☐ The Japan Socialist Party
- ☐ The Japan Telecommunications Worker's Union
- ☐ The Ministry of International Trade and Industry
- ☐ Nippon Telegraph and Telephone Corp.

GRAPHIC BY SUSAN J. CHAMPENY

KDD cuts switched service rates to stay competitive

Japanese carrier to slash prices to 31 countries.

By Lori Valigra
IDG News Service Asian Bureau

TOKYO — Kokusai Denshin Denwa, Ltd. (KDD) has upped the competitive ante in Japan's international network services arena by pledging to cut switched service rates by an average of 7.7% beginning April 1.

The April rate cuts will be the second switched service price reduction in six months by Japan's dominant international carrier, based here. The price change will also bring KDD's switched service rates on par with its two competitors, International Digital Communications, Inc. and International Telecom Japan, Inc., which began operations last year.

Overall, KDD's rate cuts will affect the price of service to 31 countries. Rate reductions for service to the U.S. will average 6.8%. KDD claims it will be offering switched service to the U.S. at prices 20% lower than what AT&T charges for service to Japan.

Unexpected move

The price changes are coming unexpectedly soon after KDD reduced rates for switched service to the U.S. by approximately 17% last November (“Carrier competition takes root in Japan,” *NW*, Feb. 26).

The November reductions came just one month after International Digital Communications and International Telecom Japan began offering switched service at rates 23% below KDD's. While KDD's tariff change narrowed the savings to about 7% for customers using the two new carriers, this week's cut of 6.8% will essentially erase the gap.

The move sent the competitors scurrying to find ways to re-

spond, recoup their start-up costs and gain a foothold in a Japanese international services market that is expected to double to \$3.45 billion in five years.

“Our basic direction is that we'll compete against them,” said Kenji Tomikawa, manager of International Digital Communications' planning department. “We've made a commitment to customers dialing 0061.”

In Japan, users access one of the three international carriers by dialing 0061, 0041 or 001 for International Digital Communications, International Telecom Japan or KDD, respectively.

International Digital Communications and International Telecom Japan officials had expected KDD to take some countermeasures to recover the 25% share of U.S.-bound traffic it had lost since the inception of competition.

But officials said that since the second reduction came so soon, it caught them a bit flat-footed. Both companies, like KDD, must apply with Japan's Ministry of Posts and Telecommunications for permission to reduce rates. Since approval normally takes 1½ to two months, the two carriers will not likely be able to cut prices by the time KDD's price cuts take effect, according to Nobuo Ito, executive vice-president of International Telecom Japan.

KDD also plans to lower prices under its volume discount pricing plan, Route KDD. Under this offering, KDD charges customers a flat rate of \$206.90 per month for a 15% discount on all traffic. With the rate reduction, KDD increased the discount to 30%.

International Digital Communications and International Telecom Japan currently have no comparable plans. ■

EC officer outlines regulatory reform

Chief policy setter Ungerer details plans to ease private net restrictions, break up monopolies.

While regulatory reform is reshaping the communications industry worldwide, in no other region are the changes as dramatic and important as in Europe's emerging Common Market. The European Commission is struggling to implement reforms aimed at breaking down carrier monopolies and improving users' service options.

The opening of European network markets is perceived as essential for the creation of a unified economy in 1992. Senior Editor Barton Crockett recently discussed the European Commission's accomplishments and goals in this area with one of its chief policy setters, Herbert Ungerer, a division head for the European Commission's Directorate General XIII. Ungerer holds doctorates in physics and economics, and an MBA from the European Institute of Business Administration in Fontainebleau, France. He spoke with Crockett in his Brussels, Belgium, office.

What is the European Commission trying to accomplish in communications by 1992?

The Green Paper liberalization package [which outlines the European Commission's blueprint for opening network markets by 1992] perceives a number of measures.

It will [create an environment in which users have] much more freedom to use a network infrastructure, both in the terminal equipment and in the services fields.

Will this mean that carriers can no longer have a monopoly over supplying network equipment to users?
Yes.

Will it also mean that carriers will no longer be responsible for approving equipment for use on the public network?

Yes. Here the commission has submitted a proposal for Europe-wide type of approval for equipment.

This means that once [equipment is] approved for use in one member state according to the procedures that will be set out, it will be fully sellable and con-

(continued on page 26)

Asia relaxes U.S. airline reservation net restraints

By Barton Crockett
Senior Editor

Long-standing Asian barriers to foreign reservation networks are begin to fall, a trend that may help U.S. network operators win a dominant position in that marketplace.

To protect national airlines and their reservation network businesses, some Asian countries have imposed tough restrictions on foreign computer reservation systems. For example, some nations don't allow foreign network operators to obtain much-needed leased circuits. In other countries, the dominant national carrier refuses to honor tickets issued by another company's reservation system.

But because of pressure from the U.S. government and new provisions in international air travel treaties, these restrictions are beginning to ease — a move which bodes well for American operators.

John Eichner, president of the New York-based computer reservation system consultancy S. H. & E., Inc., said the loosening of these restrictions could help U.S. reservation networks dominate some Asian markets. That's because American reservation network operators have a stronger international presence than existing Asian network operators and offer advanced services for travel agents that Asian competitors cannot yet match.

“They could do quite well over there,” Eichner said.

One reservation network that could particularly benefit is the Apollo network, operated by Rosemont, Ill.-based Covia Partnership. Eichner said Covia has one of the largest Asian operations of any U.S. computer reservation system, in part because of the extensive Pacific operations of its majority shareholder and founder, United Air Lines, Inc.

(continued on page 26)

World News

British Columbia Telephone Co., a Canadian regional carrier, recently announced that a new employee contract has been rejected by the 10,000 members of its Telecommunications Workers Union.

The contract offered employees an across-the-board wage increase of 7% in the first year of implementation and a 6% increase the year after that.

Additional salary increases of 1.5% were offered to operators and clerical staff in each of the two years in order to create more pay equity between female and male employees.

A company spokeswoman said that negotiators for the union and British Columbia Telephone had agreed on the contract last month but that 51.37% of the union members opposed the proposal in a series of votes that ended recently.

The spokeswoman predicted that the impasse will not end in a strike, however, since the margin of defeat was very slim. She said that, with minor changes, endorsement from a majority of the union members could be achieved.

Union leaders will meet March 24 to work out a new position, she said. ■

EC officer outlines regulatory reform

continued from page 25

nectable to the [public] network in all European countries.

When will this measure take effect?

That depends on the political process. Normally, I think one has to wait between one and three years [for European Commission legislation]. And then some time must be given, normally about one year, for member states to put this into effect in national legislation.

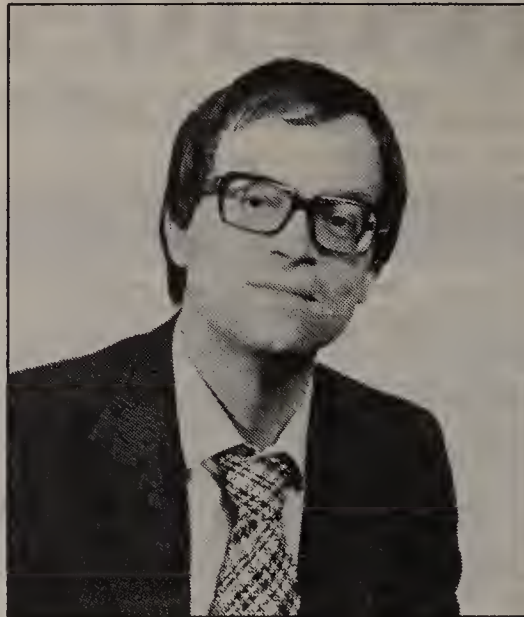
One must remember that the carrier networks in Europe are all based on different technology and each has its own 100-

year history. So implementing some of these things will take time.

Can you explain what the European Commission is doing with respect to network services?

There we have a parallel approach. The telecommunications ministers in the European Commission reached a compromise in December that called for the lifting of monopoly positions in the value-added network area and the harmonization of network access through the so-called Open Network Provision [ONP] framework directive, which is the European counterpart to [Open Network Architecture].

From the user perspective, what will this mean?



EC's Herbert Ungerer

It will mean that most of the current restrictions for use of telecommunications networks in Europe will fall. To be precise, the arrangement will allow the prohibition of voice resale on leased lines. But it will require a lifting of prohibitions on resale of data services via leased lines and public data networks by the end of 1992.

Does this mean that it will be easier for users to operate shared networks?

Yes, substantially.

Will ONP affect network service prices?

It contains a clear statement that tariffs must be cost-oriented.

What is the European Commission planning to do concerning the satellite market?

There the goal is to issue a position paper in the first half of this year. I think the commission wants to see a certain liberalization of the VSAT satellite markets. The paper will also address other issues, including the terminal equipment market, the future of the space segment in Europe and the problems involved in the Europe-wide operation of satellite-based services.

What other issues are on the European Commission's agenda?

Later this year, there will be a directive on leased lines, which will concentrate on the Europe-wide availability of certain types of leased lines and the full implementation of the general principles in the ONP directive. ■

Asia relaxes airline net restraints

continued from page 25

Greg Merkley, Covia's manager of international operations, said the Apollo network supports some 2,500 reservation terminals in Australia, China, Hong Kong, Japan, New Zealand and Singapore.

Yet Merkley said that because of restrictions on the purchase of leased lines for value-added networks, Covia isn't able to operate in South Korea. He said that leased-line restrictions in Taiwan similarly shut Apollo out. Taiwanese regulators place tight restrictions on international leased lines carrying data because of security concerns.

Merkley said Covia also faces restrictions against issuing tickets for national airlines in several Asian countries.

But that's changing. Last month, Covia, which has been operating its Apollo network in Japan since 1986 and now has 1,200 terminals there, reached an agreement that for the first time will enable it to issue tickets for Japan Air Lines flights.

Merkley said rule changes recently enacted by the International Air Transport Organization, an industry watchdog, should enable the company to begin issuing tickets for airlines in Hong Kong and Singapore in the future.

In addition, he said the U.S. government is pressuring South Korea in negotiations over international air travel rights to allow U.S. travel reservation systems to obtain leased circuits there. Merkley added that Taiwan is beginning to ease restrictions on the transport of data over international leased lines.

"This makes us very optimistic about our growth potential in the Pacific Rim," he said. ■

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

DFT terminal emulator requires minimal memory

Network Software Associates, Inc. recently introduced IBM 3270 terminal-emulation software that the company said uses less memory than any emulator supporting IBM's Distributed Function Terminal (DFT) mode.

The software, **3270/Elite**, runs under PC-DOS on any IBM Personal Computer or Personal System/2 and requires only 60K bytes of memory. The software emulates an IBM 3278/9 Model 2 terminal in DFT mode, which lets a single terminal support up to five concurrent host sessions and perform logical unit processing, rather than having a terminal controller perform this function, as is done in Control Unit Terminal mode.

In this initial release, 3270/Elite supports only one host session, but it enables the personal computer on which it runs to perform logical unit processing. This capability allows the personal computer to support printers.

3270/Elite will be available May 1 for \$245.

Network Software Associates, Inc., 39 Argonaut, Laguna Hills, Calif. 92656; (714) 768-4013.

Gateway allows PCs to communicate with minis

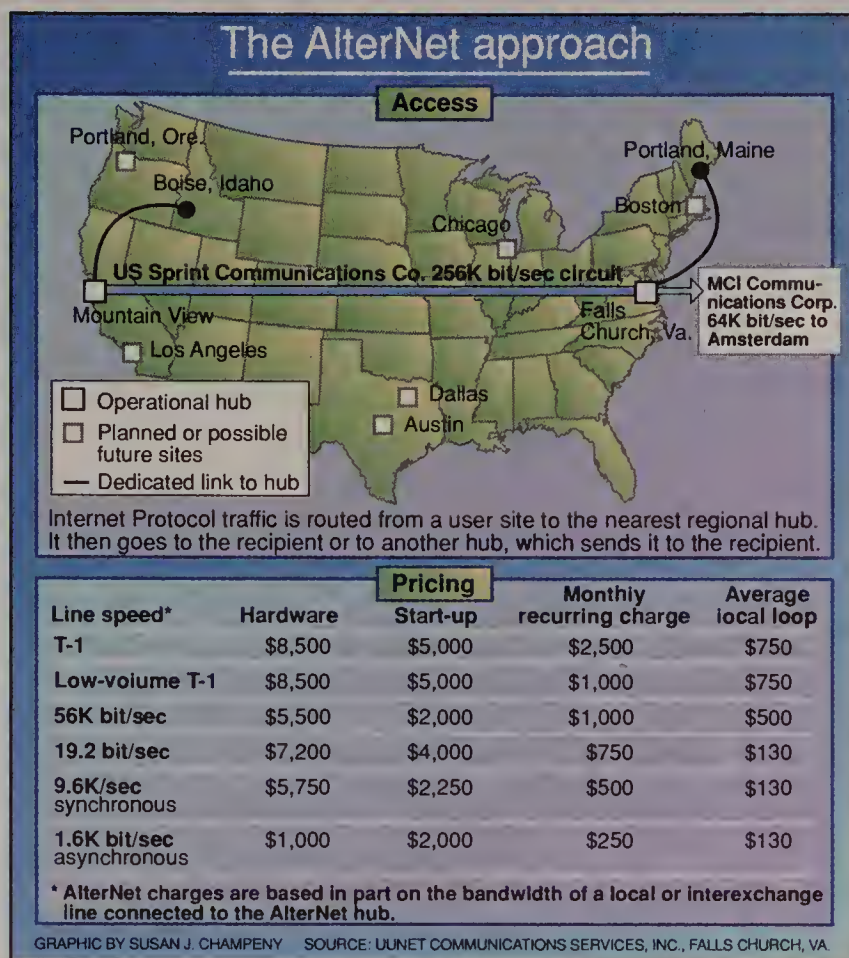
Andrew Corp. recently introduced a gateway that enables local-area networks to communicate with IBM System/3X and Application System/400 minicomputers.

NetLynx 5251 consists of an interface board and software. The interface can be installed in any Network Basic I/O System-compatible LAN node that is attached to the minicomputer via twinaxial cable. The software enables each LAN node to emulate IBM 5250 terminals to communicate with the minicomputers.

NetLynx 5251 supports a variety of LAN interfaces, including Arcnet, Ethernet, Starlan and token ring, as well as Novell, Inc.'s NetWare and Banyan Systems, Inc.'s VINES LAN operating systems.

The product is available now for \$1,995.

Andrew Corp., 2771 Plaza Del Amo, Torrance, Calif. 90503; (213) 320-7126. □



IP service offers alternative to public, private networks

Eliminates usage-based charges of public nets.

By Tom Smith
New Products Editor

FALLS CHURCH, Va. — UUNET Communications Services, Inc. recently began offering a public network service for the transmission of data supporting the Internet Protocol (IP).

The service, dubbed AlterNet, is a low-cost alternative to private networks and public packet-switching networks that supports the exchange of engineering drawings and other file transfers, as well as the transmission of electronic mail. It also supports the ability to run remote X/Window System applications.

Unlike public data networks, AlterNet does not impose extra volume-based charges for the number of packets transmitted, but instead bills users solely on the amount of bandwidth they consume.

"This is designed for users that would like to have a real network connection just like a big company but can't afford it," said Rick Adams, president and founder of UUNET.

AlterNet consists of a 256K bit/sec leased line from US Sprint Communications Co. that connects regional hubs here and in Mountain View, Calif., as well as a 64K bit/sec leased line from MCI Communications Corp. that links the hub here to a hub in Amsterdam, which also has a connection to Paris.

The company is in the process of installing hubs in Boston, London, and Portland, Ore., Adams

said. Other likely sites include Austin, Texas, Chicago, Dallas and Los Angeles.

Users utilizing bandwidth of 56K bit/sec and above must employ cisco Systems, Inc. routers to access the service over leased-line connections to hubs, which also use cisco routers to direct incoming data to the appropriate destination.

Adams started UUNET in 1987 as a nonprofit corporation serving the Usenix Association of Unix system users. Since that time, UUNET has been offering a store-and-forward service for E-mail, called UUNET, and Unix-to-Unix Copy Program messages.

The company's approximately 1,300 subscribers have dial-up, leased-line or public network access to UUNET's hub here, from which their messages are routed to their destination. A 64K bit/sec connection from the hub here to the Amsterdam hub supports international communications.

Customers of the existing service, which will still be offered, asked for dedicated, high-speed connections because of the volume of traffic they were generating, Adams recalled.

"They didn't all qualify for Internet access," he said. "On the other hand, most of them run IP on their LANs and thought it would be easier to connect directly to our hub."

AlterNet will offer users with government clearance access to Internet as well, through a T-1 (continued on page 49)

EDI package features applications gateway

Component saves users from building translation programs or reentering data into applications.

By Tom Smith
New Products Editor

NORWALK, Conn. — TSI International, Inc. last week said it is developing electronic data interchange software with an applications gateway that enables users to integrate EDI data into existing applications.

Being able to integrate EDI data such as purchase orders into order-entry systems and other production applications will save users from writing translation programs or from printing out EDI documents and then rekeying them into application programs.

Separately, TSI announced it has acquired the software division of TranSettlements, Inc. of Atlanta for an undisclosed amount. TSI has yet to determine whether or how that company's EDI software package, TranSlate, which has an installed base of more than 200 users, might be integrated into its new package.

Trading Partner, the new software under development, has five components, all of which run on an IBM mainframe: a communi-

cations gateway, a translator, an administrator, an auditor and the applications gateway.

The communications gateway provides users with the software interface from the mainframe to telecommunications services, such as value-added networks, dial-up lines or remote job entry connections. This gateway sends data to and receives it from the translator component, which sorts messages according to transaction sets — such as purchase orders — and checks each message for compliance to standards such as ANSI X12.

The administrator component has a CICS interface for IBM 3270 workstation users to outline EDI transaction sets and standards to be used in an EDI partnership.

The auditor logs inbound and outbound transmissions, and logs errors for batches and transaction sets.

The one component of Trading Partner that will separate it from other packages is the applications gateway, according to Constance Galley, president and (continued on page 45)

Davox introduces larger, more powerful autodialer

BILLERICA, Mass. — Davox Corp. recently introduced a high-end autodialer that processes calling lists up to 20% faster than the company's existing model.

The new Computerized Autodial System (CAS) 2000 supports as many as 128 phone lines and 64 agent workstations. The older CAS 1000 supported 64 lines and 32 agents.

The CASs, designed for applications such as credit card collections and telemarketing, maximize dialing productivity by placing calls simultaneously over multiple phone lines.

The old vs. the new

Because it's based on the higher performance Motorola, Inc. 68020 processors, CAS 2000 can speed calling list processing by 20%. The microprocessor also lets CAS 2000 communicate with Davox's data manager, an IBM Personal Computer AT-class machine that controls screen transfers from the autodialer to agent workstations at 38.4K bit/sec,

whereas CAS 1000 performed this function at 9.6K bit/sec. CAS 1000 was based on the Motorola 68000.

A new, optional, record-excluder filtering package allows users to identify — in real time — accounts to be excluded from the calling list.

In a collection application, for example, this would enable users to eliminate the chances of calling a debtor whose payment has recently been received.

CAS 2000 is available now. Prices range from \$160,000 for a 16-line, eight-agent autodialer to more than \$1 million for a 128-line, 64-agent system. CAS 2000 prices are approximately 10% higher than CAS 1000 models supporting the same number of agents and lines. A hardware and software upgrade for CAS 1000 sells for \$70,000. The record excluder option costs \$3,000.

Davox can be reached by writing to 3 Federal St., Billerica, Mass. 01821, or by calling (508) 667-4455. □

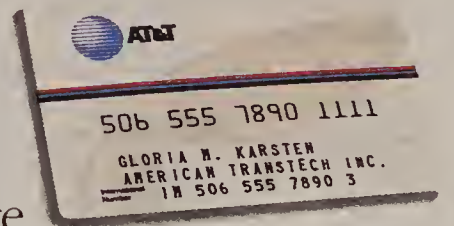




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OPINIONS

ISDN

BY JAMES CARLINI

ISDN is headed for a last stand with users

Many end users, skeptical about the value and benefits of Integrated Services Digital Networks, are not joining the ISDN wagon train. ISDN is in danger of becoming telecommunications' Little Bighorn of solutions in search of problems.

If ISDN had come out 10 years ago, end users in all major industries would have seen it as a dominant, if not exclusive, solution to many complex network problems. In 1979, there were only two or three accepted ways to build a large data or voice network. Since then, communications technology has advanced considerably and alternative network designs have been implemented successfully.

Unfortunately, many market strategists for ISDN think it is still the late 1970s and that end users will flock to a so-called universal solution. But there is no universal solution for network design anymore. Many organizations have had to develop their own unique solutions by piecing together different vendors' equipment and services. In some cases, users have become more sophisticated than ISDN vendors realize; they've already created pseudo-ISDN environments.

ISDN has to take on a simpler definition and application than most RBHCs are giving it.

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Many, if not all, of the regional Bell holding companies are searching across a desert of ideas for those "green applications" for ISDN. But they are making a major blunder: They are conducting their search as if they need to create a specialized package of ISDN for each industry.

The RBHCs are trying too hard to come up with specialized applications that don't have much use in the real world. They should try to sell ISDN the way they sold WATS — as a solid service with benefits that everyone can understand. There was no need to differentiate WATS applications as being exclusively for retail, manufacturing or banking. ISDN, on the other hand, is positioned by some marketing strategists as a complex, industry-specific service platform, which users will view as costing a lot to install while having no easily identifiable benefits.

It's time to redefine ISDN. We could begin by saying it's a service that provides tangible benefits to the user and to the provider. It should not be sold as a universal solution, but rather as a solution that's adaptable and flexible.

ISDN has to take on a simpler definition and application than most RBHCs are giving it. End users are getting mixed signals and are, in turn, forming their own users groups that are resisting the vendor applications being pushed on them. Some want to devise their own applications and standards, while others are forming negative opinions about ISDN and are becoming disinterested.

There is definitely a large market for ISDN, but those who could use the technology must get a demonstration with less smoke and more tangible benefits.

Otherwise, ISDN is not going to sell; users will choose alternate communications solutions.

Some ISDN marketing strategists will disagree and say they are too busy to stop and listen to these new ideas. Unfortunately, they are like General Custer telling his aide that he is too busy watching the approaching Indians to talk to the Gatling gun salesman. ☐

Carlini is president of Carlini & Associates, Inc., a management consulting firm in Hinsdale, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

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EDITORIAL

The standards process — caught in an endless loop?

The standards process is bogging down just when it desperately needs to accelerate.

Once the need for a specific standard is recognized, it takes so long for it to be finalized and for products based on it to become available that users lose patience and go with solutions that aren't based on standards.

So many forces are at work today to impede standards development that, taken together, they seem overwhelming:

- The pace of technological change is still accelerating, leading to a rapid increase in the total number of existing and proposed standards.

- The increasing complexity of high-technology products is leading to a corresponding increase in the complexity of individual standards. And this means, in turn, that it will take longer to develop each successive generation of new products, as well as any new standards relating to those products.

- Technical experts who are qualified and able to devote themselves full-time to the standards development process are in short supply.

As the number of standards committees increases, only the largest vendor companies can afford to devote staff time to keeping up with all of the committees. Users — who stand to benefit most from standards — are least likely to participate in developing them.

- More and more interested parties

are jockeying to influence the standards process.

While only a few activist user companies are involved, standards committees are besieged by a growing number of vendor companies, government entities and special-interest associations and consortiums.

- The need for better coordination among national, regional

standards are virtually obsolete by the time they are agreed upon and implemented. The result is that users opt for practical, de facto solutions rather than waiting for standards-based products.

Witness the popularity of Transmission Control Protocol/Internet Protocol and the current reluctance of users to invest in Open Systems Interconnection.

When vendors see users investing in products that are not based on formal standards, the quarterly bottom-line mentality sets in. The vendors decide to push proprietary approaches rather than invest in making their products compliant with standards.

What can be done? Standards development timetables could be shortened significantly if the process were automated.

In an on-line, networked environment, committee members could work together efficiently without the need for frequent travel.

Committee procedures could be streamlined, and the various standards organizations could work harder to coordinate their activities in advance to avoid duplication of effort.

Unless these and other concrete steps are taken to accelerate the standards process as soon as possible, it is likely to remain in an endless loop that takes longer to traverse each time through. ☐

With so many obstacles in the way, it's no wonder that some standards are virtually obsolete by the time they are agreed upon and implemented.

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and global standards organizations continues to grow.

- Even after a standard is implemented, it takes still more time for conformance testing laboratories to develop and certify the tools that enable them to test products for compliance with that standard.

Unplanned obsolescence

With so many obstacles in the way, it's no wonder that some

OPINIONS

OSI

BY JOHN MCQUILLAN

The unraveling of interoperability

The technical difficulties of achieving interoperability among diverse communications systems seem to be increasing lately.

Although Open Systems Interconnection products will become available this year, the growing popularity of Transmission Control Protocol/Internet Protocol has stolen OSI's thunder.

Furthermore, industry-standard solutions, especially Systems Network Architecture and personal computer local-area networks, will outnumber the solutions of OSI and TCP/IP combined for several years.

Some successful network technologies — for example, the Ethernet technology that formed the basis of the IEEE 802.3 standard — have developed through industrywide cooperation, not competition. Three communities cooperated to make Ethernet a success. First, the research community developed Ethernet at the Xerox Corp. Palo Alto Research Center with collaboration from other organizations.

Second, several industrial organizations supported this research effort because they recognized that it offered important benefits for suppliers and users alike. A key turning point in the evolution of Ethernet came when Digital Equipment Corp., Intel Corp. and Xerox joined forces to develop chips and software that supported Ethernet.

Third, the Institute of Electrical and Electronics Engineers, Inc. ratified the 802.3 standard, building on the work of the research community and the industrial partnerships. With three key communities pulling together, the success of Ethernet/802.3 was assured.

Now, unfortunately, these three communities are no longer

McQuillan is president of McQuillan Consulting in Cambridge, Mass. He assists users and vendors in planning communications systems.

pulling together. The standards community has made OSI its priority. However, the research community has paid little or no attention to OSI development.

For a variety of reasons, computer scientists concluded several years ago that OSI was going to be "too much, too late." They understood that OSI's higher level protocols were more mature, richer and more complete than the corresponding services TCP/IP provided; but they preferred the simplicity of TCP/IP.

More to the point, many com-

Computer scientists concluded years ago that OSI was going to be too much, too late.

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puter scientists have begun to improve TCP/IP implementations to boost their performance in anticipation of broadband networking and to add services and capabilities such as new types of service routing.

To combat the claim that OSI's higher level applications are more complete, some people in the TCP/IP community have developed solutions for running higher levels of OSI on top of TCP/IP's lower levels.

Finally, there is the network management debate. Recently, there has been a flurry of activity aimed at implementing Simple Network Management Protocol for TCP/IP and OSI environments.

But the computer science community is not only turning its back on the OSI movement; many scientists are doing everything they can to subvert it.

Meanwhile, industrial organizations have not been paying much attention to the research world's TCP/IP activities or the

standards bodies' OSI work. Commercial wide-area networks are currently dominated by SNA, a proprietary solution designed to achieve completely different goals than TCP/IP and OSI, both of which were designed as vendor-independent methods of linking multiple, diverse networks into a larger internet.

The LAN situation is somewhat similar. LAN products were developed very rapidly and in parallel by a number of different vendors for a competitive market characterized by explosive growth.

The different LAN operating systems of Novell, Inc., 3Com Corp. and Banyan Systems, Inc., as well as IBM's PC LAN Program, are each based in part on proprietary solutions. Instead of focusing on standard solutions for moving files and messages such as TCP/IP and OSI offer, these LAN operating systems meet a different set of requirements for functions such as file access and resource sharing.

The LAN operating systems have neither benefited from the Internet experience in providing true Layer 3 and Layer 4 protocols nor have they benefited from the standardization work in OSI, such as X.500 for global naming.

If OSI had been available three or four years ago, it might have short-circuited the widespread growth of TCP/IP and strongly influenced the growth and development of LAN operating systems and SNA.

But as it stands now, OSI will not reach the market in fully mature products for another couple of years. By then, users will have made substantial investments in other technologies and researchers will be focusing on new horizons.

All of this is regrettable. Many vendors must now divide their resources into two or three different areas, while users are finding that they must support multiple communications architectures for years to come. We are witnessing the unraveling of the goal of interoperability. ■

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TELETOONS

BY FRANK AND TROISE

And Mister Bashfinder runs
our net department's
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...and you pay him if you don't.



LETTERS

10BaseTantrum

We would like to point out some misconceptions in your article on 10BaseT products demonstrated at the Network '90 Boston trade show ("Vendors exhibit support for IEEE 10BaseT at show," NW, Feb. 26). The article implies that SynOptics Communications, Inc. was not cooperative in demonstrating 10BaseT interoperability and, therefore, does not support the 10BaseT standard.

SynOptics is a strong supporter of 10BaseT and is a charter member of the IEEE 802.3 10BaseT Task Force, which was formed in 1987. We believe a vendor's support of standards is demonstrated through active participation in the standards creation process as well as developing standards-based products.

SynOptics demonstrated 10BaseT interoperability at Network World by sponsoring the 10BaseT Show Network, which provided more than 200 local-area network connections.

Exhibitors throughout the Hynes Convention Center used the Show Network for live demonstrations of their net-

working capabilities.

In addition, SynOptics worked closely with 3Com Corp., Tiara Computer Systems, Inc., Racal InterLan and Western Digital Corp. to provide 10BaseT network adapter cards for exhibitors' personal computers and peripherals. These companies are clearly market leaders, collectively representing more than 90% of the Ethernet adapter card market.

Our goal at Network World was to work with our Ethernet adapter card partners to show customers that 10BaseT interoperability truly exists.

Interoperability between 10BaseT wiring hubs and 10BaseT adapter cards is important because a majority of 10BaseT connections will be made between the wiring closets.
(continued on page 34)

Network World welcomes letters from its readers.

Letters should be typed, double-spaced and sent to Editor, Network World, 161 Worcester Road, Box 9172, Framingham, Mass. 01701.

Letters may be edited for space and clarity.



FEATURES

Success hangs in the balance

Net managers
shouldn't fear
merger and
acquisition
mania; it
provides them
with unique
opportunities
to excel.

CONTINUED FROM PAGE 1
while maintaining control of pertinent technical issues.

Mergers present the network manager with an opportunity to effect radical cultural and organizational change, which is nearly impossible to do in stable times; there are too many forces in place that resist it.

But before wading in to determine a strategy for changing the old way of doing things, a network manager should study the merger from a business point of view, specifically, how the new organization is expected to succeed and what role networking will play within the new corporate environment.

First, the network manager should identify and review the goals of the combined organiza-

Kennedy is unit manager and Worth is senior consultant with Arthur D. Little, Inc. of Cambridge, Mass.

tions and then determine the potential contributions that the networking function can provide to the merging process and the ongoing operations.

In most cases, top management will articulate the reasons for the merger and the benefits expected from it. Some expected benefits will be explicitly stated or readily inferred by the nature of the merger. For example, if both organizations are weak financially or if highly leveraged loans were used to consummate the deal, the network manager knows that rapidly attaining cost savings is tantamount to success. Only limited amounts of new capital equipment, if any, will be available.

Further, because of the necessary sensitivity to financial realities, a thorough, elegant engineer's approach to a smooth transition will be viewed as a luxury by senior management. They will be more in favor of a crash program that will quickly achieve the needed savings.

(continued on page 34)



ILLUSTRATION ©1990 DAVE CUTLER

(continued from page 33)

However, in another case, the merging organizations may be naturally complementary. Therefore, the key to success is to link their separate operational activities closely, either temporarily or permanently. In this situation, new or enhanced network capabilities and increased funding may be necessary.

In another instance, the merger may take the form of a holding company in which the two entities retain their separate identities, reporting only operational and financial results to the parent. The purpose of this approach is to grant autonomy to the local management team by simply assigning responsibility and retaining the essence of creativity, while monitoring performance.

In this case, combined operations may or may not be appropriate, depending on the company's philosophy toward the provision of centralized services by a corporate organization. Plans for the provision of data processing services — centralized or decentralized — may provide clues about the best networking approach.

After reviewing the available information about the merger goals, the communications manager will frequently become frustrated because only the broadest objectives or sketchy alternatives may be defined. The network manager must, therefore, determine potential contributions the network can make in supporting the new business and communicate these points to senior management as part of the goals formulation process.

For the purposes of this discussion, these potential opportunities will be described as having

Some mergers will require a more effective network.



cost savings or enhanced network functionality characteristics.

Cost savings

Basically, the name of the game in reducing network costs is volume discounts. During a merger, the opportunities to do this are likely to be tremendous.

Network managers can reduce usage charges by increasing the volume of traffic on virtual private nets or by justifying greater use of high-speed facilities, such as 1.544M bit/sec T-1 and 45M bit/sec T-3 lines, which are less expensive than lower speed facilities above a certain break-even threshold of traffic volume.

Another way of building traf-

fic volume, beyond simply combining the traffic of the two entities, is to integrate voice and data traffic onto the same facilities. This integration increases the traffic load on a single type of facility and contributes toward eligibility for higher volume discounts, which carriers offer on a sliding scale.

Since, initially, the combined entity will probably have too many suppliers, cost savings can be reaped by reducing the number of suppliers through a competitive bidding process. Savvy net managers can use this tactic for both transmission facilities and customer premises equipment.

Finally, savings may be achieved in the operations area. Some overlap will almost certainly exist in the network management and administration activities. A technique for assessing the staffing requirement will be described later.

Enhanced functionality

In some mergers, achieving business goals will require a more effective network. Examples of enhanced functionality to increase the effectiveness of networks include integrated facsimile, electronic mail and voice messaging; advanced customer service centers; and electronic data interchange.

Once business goals have been defined and related to possible network solutions, the net manager must assess the networks that have been acquired. Usually there will be at least two network managers, each unfamiliar with the other's network. They must methodically study the existing networks. First, issues related to combining the separate networks should be identified. Then, each organization's required information flows should be analyzed. Finally, solutions that address the issues should be developed.

As a first step, it is a good idea to conduct a series of interactive working sessions to become familiar with the staff and networking capabilities of the other organization. During these sessions, time should be spent brainstorming about how to verify the potential business contributions identified previously, how to identify and select among alternatives, and what the decision-making process should be.

The intention of this activity is to set the stage for the structured process of analyzing the information flows of the new organization. A list of issues that need to be resolved will provide guidance during the analysis and a checklist for completeness at the end of the activity.

Analyzing the information flows, which is based on the concept that an organization consists of a hierarchy of functional processes that are performed to carry out the business mission, consists of four steps:

■ **Develop a functional pro-**

cess model. Decompose the organization's activities into its functional processes and the information flowing between them.

■ **Map information flows on to the functional process model.** Project future traffic volume, connectivity and performance requirements that are ex-

Basically, the name of the game in reducing network costs is volume discounts.



pected to evolve.

■ **Map information flows on to existing network schematics.** Associate the processes and flows with the organization's physical locations and existing networks.

■ **Incorporate flows into alternative network architectures.** Develop new network architectures that meet the projected requirements and satisfy the needs for information flows within the merged organization.

These steps form a hierarchy of functional processes that are performed to carry out the business mission.

The advantage of this approach is its inherent ability to document the functional processes and network needs of the merged organizations and to link alternative network architectures with their business goals.

Develop solutions

The network manager develops a networking solution by selecting an alternative that not only makes sense from the technical business objectives point of view but also from a more detailed financial standpoint.

It is usually necessary at this stage of the decision process to further estimate the expected costs to another level of detail so that the recommended networking solution can be included in a networking business plan.

Next, the staffing and migration components of the plan must be determined to complete the recommendation and obtain approval to proceed with implementation.

Assess the networking staff

One approach network managers can take when assessing their networking staff is to apply the concept of the information-based organization. In an information-based organization, current, accurate and complete information is made available to all employees, allowing each worker to perform a broader set of activities.

For example, in an information-based organization, one airline agent could handle your flight reservation, special meal, hotel booking, car rental and the-

ater ticket because every agent has the ability to access all the relevant information. Or a salesman in the field could quote reliable delivery times without having to pass the order to headquarters so that the logistics supervisor can check with the production control personnel to

determine which distribution center can ship the goods and when.

The objective of this approach is to streamline end-user interactions with the networking organization and create an efficient organizational structure that minimizes the passing of transactions from one department to another. Instead, one worker handles the business transaction from start to finish.

This idea is the opposite of the concept of mass production through division of labor: Instead of dividing the work into repetitive tasks, each worker completes a meaningful business activity. This enables the organization to reduce management levels and

streamline its work force.

The information-based organization techniques for network design and organizational restructuring make the migration a straightforward matter. By explicitly identifying the relationships between corporate issues and technical and organizational steps, network managers can ensure executive support. Events, schedules and required resources are well-defined and prioritized according to the formal identification of their importance and relevance to corporate missions and goals.

Window of opportunity

Mergers and acquisitions create the opportunity for proactive network managers to radically simplify their networks and networking organization. Information-based organizational concepts hold that such radical simplification is feasible only if the activities of the business are examined as a whole and not along current organizational dimensions.

Mergers create the opportunity to do this. Network managers can change old structures, divisions of responsibility and information flow patterns. Network managers involved in a merger can deploy information networking technology to streamline operations, reduce costs and drastically improve customer service. ■

Letters

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et (hub) and the desktop (adapter card).

Don Miller
Director of marketing
SynOptics
Communications, Inc.
Mountain View, Calif.

A guide to 900 services

There have been numerous calls from readers of our 900 services Buyer's Guide article ("Dialing for dollars," *NW*, Feb. 19) asking where they might find an all-inclusive listing of 900 service bureaus around the country. Such a listing is available in the *Audiotex Directory and Buyer's Guide*.

This audiotex/voice processing sourcebook lists more than 800 firms in the pay-per-call (900, 976), voice mail, facsimile and voice-response industries. Listings include hardware and software vendors, telephone companies, voice service bureaus, audio programmers, consultants and other support services. It is available for \$40 from ADBG Publishing of Los Angeles. Copies may be ordered by calling (213) 479-3533.

Other crucial information about the 900 services industry is also available in the *Network World/TeleChoice "Buyer's Guide to 900 Services,"* available for \$395.

To order a copy, call (800) 622-1108.

Daniel Briere
President
TeleChoice, Inc.
Manchester, Conn.

SONET and T-3 muxes

I read with great interest the article "Users mull trade-offs in latest T-3 muxes" (*NW*, Feb. 12), in which Timeplex, Inc.'s TX3/SuperHub was compared with Network Equipment Technologies, Inc.'s IDNX/90. However, I think that an important point was missed: the reason that Timeplex chose a different platform for its TX3/SuperHub.

We believe that Synchronous Optical Network (SONET) will become the worldwide standard for high-speed transmission over fiber-optic networks. For this reason, network managers must be sure that T-3 devices acquired today can be migrated to the SONET standard when it is implemented.

Current T-1 architectures cannot cost-effectively or efficiently migrate to SONET. Therefore, Timeplex chose a different platform for its TX3/SuperHub. By doing so, Timeplex is assuring its customers that their investment will be protected when they seek to implement SONET.

Anthony Squeglia
Director of corporate
communications
Timeplex, Inc.
Woodcliff Lake, N.J.

BUYER'S



GUIDE

BOC CENTREX OFFERINGS

Centrex redux

By DANIEL BRIERE

The Centrex vs. private branch exchange battle is nothing new. It's like the arguments over public vs. private networks, or distributed vs. centralized networks — there is no clear winner. And there shouldn't be. In some instances, Centrex service is best; in others, a PBX is best. And in some situations, both could be used.

Perhaps the most striking characteristic of the battle is the parity between Centrex and PBXs. Just a few years ago, the technical differences between the two products were remarkable. The latest PBXs sported more features and options than the most sophisticated Centrex systems.

Briere is president of Tele-Choice, Inc., a Manchester, Conn., telecommunications consultancy specializing in long-distance service analysts and network design. He can be reached at (203) 645-0471.

Today, the side-by-side comparison of features demonstrates that even down to the most discrete levels, functionality remains fairly equivalent.

For the telecommunications manager looking to upgrade an old PBX, Centrex is a viable option. It may not always be the most economical path, but it should be evaluated together with PBX recommendations.

Centrex is simply PBX-type switching capability provided by the local telephone company. As such, it is a network-based alternative to premises-based PBX systems. Being inherently tied to the public net, Centrex provides a platform for future in-

CHART • GUIDE

A Network World Buyer's Guide chart comparing a variety of Centrex services begins on page 38.

For many users, Centrex is an increasingly viable alternative to using a PBX.



If you don't choose our X.25 packet switching, you might need an additional piece of hardware.

When you make the move to X.25 packet switching, you should leave nothing to chance. Which is why you should call New England Telephone first, and ask about our Infopath™ Packet Switching Service.

From financial transactions to POS credit verification, Infopath has established a track record for providing efficient, economical solutions. It's the sure way to transport interactive communication.

The Infopath network is built on advanced, proven technology. It's the most extensive public packet network in Massachusetts, with world-wide connectivity. And it's maintained 24 hours a day, seven days a week.

The Infopath network also has built-in, diverse routing and redundancy features. You can set up disaster recovery schemes using a variety of options in our network. We can even reroute calls to an alternate computer system in busy or out-of-order conditions.

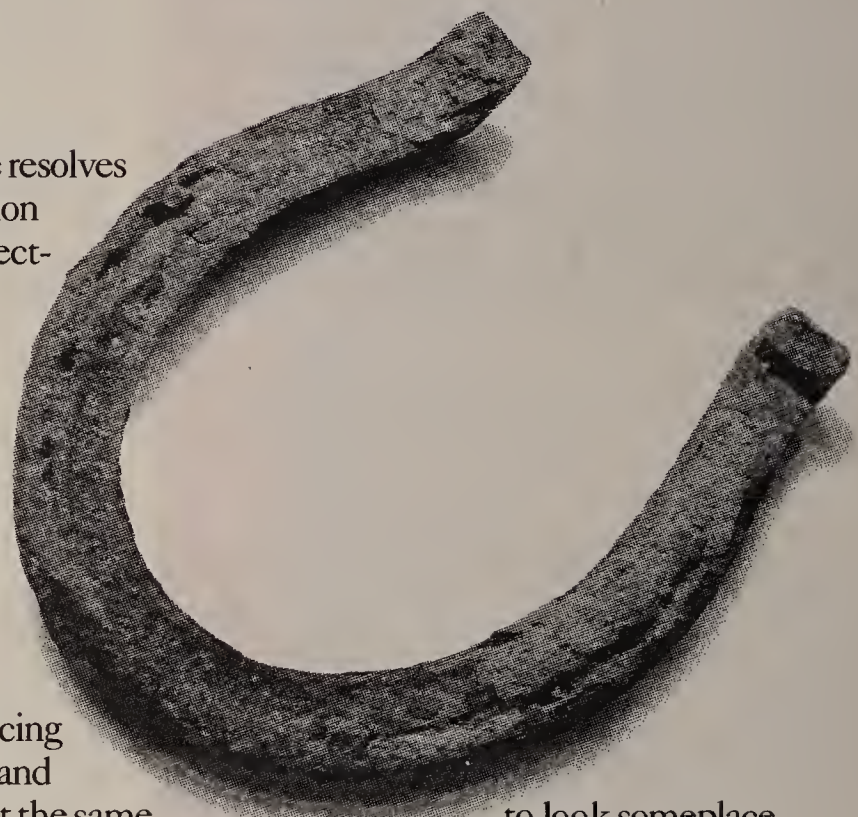
Like other advanced X.25 packet switching systems, Infopath's combination of digital transport and advanced

error recognition software resolves the problem of transmission glitches. If an error is detected, Infopath automatically resends only the data that was in error, not the entire message.

That makes your communication across the Infopath network efficient, economical and error-free.

Companies that have chosen Infopath are reducing administrative overhead and communications costs. At the same time, they are taking advantage of more timely and accurate information transactions. Infopath gives them the competitive edge today's businesses need to survive. And it's a competitive edge some of your competition may already be enjoying.

All things considered, New England Telephone and Infopath provide the kind of technology and service you simply won't find anywhere else. But should you decide



to look someplace else for your X.25 packet switching, we do have one more thing to say: good luck.

To find out more about Infopath and our other data services, contact your NYNEX Systems Marketing account executive, your authorized New England Telephone sales agent, or call us at 1 800 346-8809, extension 61.

Infopath. It's just another reason we're the one for you, New England.



New England Telephone

A **NYNEX** Company

Call New England Telephone or one of our authorized sales agents: Executone Information Systems (Boston) 1 800 852-3122; Network Research and Control, Inc. 1 800 445-4541; AIM Telephones of New England, Inc. 1 800 CALL AIM; US TeleCenters (617) 439-9911, 1 800 441-3211; Computer Telephone Corporation (617) 466-8080, 1 800 225-3288; Executone/Rhode Island, Inc. (401) 434-9000, 1 800 525-0032; COMLINK Network Services 1 800 428-2212; Community Telecommunications Corp. within ME 1 800 522-3993, outside ME (207) 377-9945.

(continued from page 35)
telligent network offerings.

Centrex uses central office-based software to define system features and functionality. Carriers can enhance the options they provide by adding software upgrades.

A typical Centrex system is composed of individual telephone company lines running to each telephone set from the local Centrex switch. While this may sound cumbersome, in reality, it is not much different from the inside wiring that most firms have today, except more lines run between the local switch and the company point of termination. Centrex can be provided through analog or digital facilities, depending on availability from the local telephone company.

Why Centrex?

Briefly, the arguments in favor of Centrex are:

■ **Minimal technological risk.** The local telephone company bears the burden of capital investment and system change-out. Obsolescence is not a factor in the decision.

■ **Continuously upgraded technology.** Since the local carrier is constantly upgrading its system with the latest technology, the user will always have the most up-to-date system. For example, Centrex customers may be the first large group of users to take advantage of Integrated Services Digital Network features as they become available in the local network.

■ **Minimal investment.** No large capital investment is required to establish service. Many existing telephone sets are compatible with Centrex, and some Centrex services work with standard business telephone lines instead of Centrex lines. Standard single-line 2500-type analog phones also work with analog or digital Centrex. Northern Telecom, Inc.'s electronic sets and AT&T's ISDN sets will not work on analog Centrex systems, however, but they will work on compatible digital systems.

■ **Around-the-clock maintenance.** No telecommunications department can match the 24-hour-a-day, 365-day-a-year maintenance that the local telephone company provides.

■ **Upgrade and downgrade flexibility.** Adding and deleting lines are simple feats with Centrex. If you want to add lines to a PBX, you may find that you need a new system. If you substantially decrease your lines, you would likely pay the same amount since your PBX remains the same. That is not so with Centrex, in which short-term expansion and contraction is inherent.

■ **Minimal impact on work environment.** Since your local telephone company houses the equipment, your work space is not cluttered with switching equipment. Extra costs for such items as floor space, heating and

air conditioning are not incurred with Centrex.

■ **Inherent redundancy.** No system is immune to downtime, but if you have one PBX and it fails, you're out of luck, notwithstanding lines that bypass the PBX and other such external arrangements. But if a central office goes down, unless it's your serving central office, chances are users' calls may be routed around the failure. The public switched network has built-in redundancy that is hard to match with PBX technology.

■ **Long-term pricing plans.** Centrex customers can control long-term costs through rate-stabilized pricing.

The drawbacks of Centrex are not as numerous:

■ **Lack of control.** Centrex gives control over a user's network to the local telephone company. Many companies prefer to retain control of their network by using a PBX and its related network management capabilities. However, telephone companies have recently introduced new network management packages that give users broader control over their Centrex networks. These allow such capabilities as Centrex reconfiguration, trouble reports and service-order status.

■ **Expense.** Depending on where your company sites are located relative to the nearest Centrex office, costs can be quite high for Centrex access lines that are mileage-based.

■ **Consolidation.** PBX users can consolidate local trunks to minimize monthly line costs. Thus, 100 station users might share just 30 outgoing lines. Conversely, under Centrex, users are each served with lines and stations of their own. However, Centrex can be used to aggregate multisite, outbound WATS traffic over fewer dedicated trunks. PBXs would have access lines running from each site, unless the sites used a private network to consolidate the traffic.

Sometimes both a PBX and Centrex are installed and in use at a single location. One instance is PBX capping. When a user hits the upper end of a PBX's capacity, the options for expanding that capacity to handle more lines are usually limited. Sometimes, an entirely new PBX is required, which can cost hundreds of thousands of dollars. A viable solution for PBX capping is using Centrex: Some system users could be converted to Centrex, letting the public net handle the extra usage.

■ **Feature availability.** Centrex and PBXs may offer the same range of features. However, due to partitioning in the Centrex switch, Centrex customers may have access to only a limited subset of features.

Centrex is an ideal service for companies with dispersed locations within the same city or geographical area. Typical users are insurance companies, banks, and state and federal governments —

all users with multiple locations. With Centrex, these companies can have a unified dialing plan linked with common features.

Multisite companies currently use tie lines to interconnect PBX-served sites. These users have to seize an intersite tie line to transfer inbound calls from the main number across the local private network to another site. With Centrex, the local public network transfers these calls, leaving inbound and outbound lines free for other calls.

Universities inherently are targeted for Centrex because their telephone systems are usually nonblocking networks. Each dormitory room or office has a line allocated to it from the public network. They do not contend for outbound lines. However, some universities, such as Duke University in Durham, N.C., are doing

tivity.

Most managers consider the ability to add, delete, move or upgrade users and features easily to be a basic characteristic of a company telecommunications system. According to Bell Atlantic Corp. figures, in the average business, 30% of the employees make office moves each year. It's little wonder that feature management systems are a required ingredient of Centrex systems.

Standards for this capability for Centrex exist, and most local telephone companies have adopted them in some manner. The standards let users perform tasks such as reassigning phone numbers, controlling bulk feature changes and modifying directory information.

The next big step is network management. Users opting for Centrex want to get back some of

problem, but a necessity.

Centrex-based, or central office-based, LANs are now available on a limited basis around the country. The expansion of digital switching technology allows local carriers to provide a range of advanced integrated voice and data applications.

With central office-based LANs, users can transmit voice and data at speeds of up to 19.2K bit/sec in most instances, eliminating the need for dual facilities. Users can also access WANs, value-added networks and packet networks with central office-based networks.

The advent of ISDN brings more data transmission capabilities to central office-supported data networks. Interestingly, the local telephone companies are stressing initial ISDN applications through Centrex packaging, rather than as stand-alone products. However, large corporations tend to be the early adopters of new technology, and most of these same companies have PBXs, not Centrex.

ISDN brings with it standardization and advanced features across the public network, and Centrex users have direct access to this functionality from their desks. Because PBX station users are behind a PBX, they are limited to whatever functionality the PBX is capable of passing along.

ISDN allows all sorts of integration on a Centrex line. A user can change from a standard Centrex line to a multiuse ISDN line, and users can put all sorts of terminal equipment behind the ISDN Centrex line. For instance, consider putting two users on one ISDN line, each with a second voice path, communicating personal computers and a fax machine. Under analog Centrex, there would be eight separate access lines for this same setup.

Centrex pricing

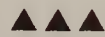
The most difficult aspect of Centrex is probably pricing. For most large customers — those with 100 or more stations — pricing is often cited on an individual-case basis. What's more, features are often bundled with these packages.

The chart beginning on page 38 lists the range of pricing that a user can expect for different local exchange carrier offerings. Depending on customer size, distance from the Centrex central office, contract length, bundled features and similar items, pricing can vary substantially, sometimes by as much as 200% to 300%.

For the user, the cost figures in the chart provide some benchmarks as to how much Centrex might cost relative to other options. Large users that are located less than 1½ miles from a Centrex central office and are willing to commit to long-term plans can expect to pay the lower end of the spectrum.

(continued on page 42)

Centrex customers can control long-term costs through rate-stabilized pricing.



fine with their own Class 5 central office switch or high-capacity PBX serving the campus.

Centrex also is ideal for small firms — those with less than 10 standard business lines — that want the capabilities of a full-sized PBX but cannot afford the equipment. Most small firms upgrade to Centrex to "make their dumb phones smart," according to Centel Corp.'s advertising slogan.

Centrex features are highly sophisticated and complex. The simplest features are considered basic to most Centrex systems — call forwarding, intercom, speed calling, call pickup, call hold and three-way call conferencing. Some Centrex carriers charge for these basic features; others fold them into the basic service offering.

Some of the hottest topics in Centrex bids today are station message detail recording (SMDR), voice mail, voice/data integration and network control.

SMDR — both on-line and print reports — is quickly becoming available in Centrex systems nationwide. What's great about this SMDR is each station is represented as an individual user — that gives a company extra flexibility in creating individualized organizational reports.

Voice mail for Centrex is typically a stand-alone or external system offered by the local exchange companies but made available to Centrex customers for their use. Centrex voice mail works just like the standard PBX system voice mail. Voice mail allows system users to leave internal messages for one another, thus increasing internal produc-

the control they had under PBX-based networks, and they're getting it. In areas served by digital switches, telephone companies are selling customers Centrex line administration systems that offer the same network management capabilities as PBXs.

Moreover, many telephone companies have started implementing open operations support systems that allow users to enter orders for new services, report trouble with their lines and receive instant reports on the use of their telecommunications services.

Other often-requested features include:

■ **Uniform call distribution (UCD).** When peak lines get overloaded during peak volume periods, central office-based UCDs can divide voice traffic evenly among stations to ensure the highest degree of completed calls.

■ **Automatic route selection (ARS).** What UCD does for incoming voice traffic, ARS does for outgoing calls. Users can preprogram alternate routes for time-of-day and day-of-week calling peaks, as well as for long-distance calling economies. Some carriers offer a queuing feature, which holds outbound calls in a queue until the optimal route is free.

Data transmission

Data transmission in the local exchange environment is a booming issue for telecommunications and data communications managers. With the proliferation of local-area networks and wide-area networks, high-speed interconnection becomes not only a

Centrex services

Local exchange company	Product	Target market (lines)	Contract lengths available	Usage fee rating	Installation charges	Monthly line charges	Monthly system charges	Monthly usage fees	Monthly network interface fees	Number of free message units	Monthly minimum	Major features available
Ameritech — Illinois Bell Telephone Co. Chicago (312) 727-9411	Analog Centrex	2 to 5,000+	Month to month; 36, 60 or 84 months	Measured rate	\$750 to \$28,550 for system, depending on contract length	\$10 to \$18, depending on contract length	None	Message rate: \$.05 per call	Facility- and service-dependent	None	None	ACD, CDR, FMS, UCD
	Digital Centrex	2 to 5,000+	Month to month; 36, 60 or 84 months; ICB for larger users	Measured rate	\$750 to \$28,550 for system, depending on contract length	\$10 to \$18, depending on contract length	None	Message rate: \$.05 per call	Facility- and service-dependent	None	None	ACD, FMS, UCD
Ameritech — Indiana Bell Telephone Co. Indianapolis (800) 242-8580	Centrex, Digital Centrex	11 to 30,000+	Month to month; 36, 60 or 94 months; ICB for larger users	Flat rate	\$910 to \$1,930 for system, depending on contract length	\$9.75 to \$16.50, depending on contract length; ICB for larger users	None	None	\$34	NA	11 stations	ACD, ARS, CDR, FMS, UCD
Ameritech — Ohio Bell Telephone Co. Cleveland (800) 660-3000	Centrex, Digital Centrex	2 to 30,000+	Month to month; 36, 60 or 84 months; ICB for larger users	Measured rate	\$850 to \$1,525 for system, depending on contract length	\$16.45 to \$29.30, depending on contract length; larger systems, ICB	None	Message rate, \$.08 per call; 55-call maximum charge per line	Facility- and service-dependent	None	None	ACD, ARS, CDR, FMS, UCD
Ameritech — Michigan Bell Telephone Co. Detroit, Mich. (313) 223-9900	Centrex IV	2 to 5,000+	Month to month; 36, 60 or 84 months	Measured rate	\$750 to \$3,800 for system, depending on contract length	\$16 to \$19, depending on contract length	\$25	Message rate: \$.08 per call	Facility- and service-dependent	None	None	ACD, ARS, CDR, UCD
	Centrex V	2 to 5,000+	Month to month; 36, 60 or 84 months	Measured rate	\$800 to \$3,000 for system, depending on contract length	\$10.30 to \$14.50, depending on contract length	\$20 to \$30	Message rate: \$.08 per call	Facility- and service-dependent	None	None	ACD, ARS, CDR, UCD
	Centrex DS	2 to 5,000+	Month to month; 36, 60 or 84 months	Measured rate	\$525+ for system, depending on contract length	\$10.75 to \$17, depending on contract length	\$20 to \$40	Message rate: \$.08 per call	Facility- and service-dependent	None	None	ACD, ARS, CDR, UCD
Ameritech — Wisconsin Bell, Inc. Milwaukee (414) 456-3000	Centrex System 20, Custom CTX 2, Custom CTX 3	6 to 100+	Month to month; 36 and 60 months	Measured rate	\$200 to \$800 for system, depending on contract length	\$10.50 to \$16.50, depending on contract length	None	Message rate: \$.09 per call	Facility- and service-dependent; average cost per facility \$60 to \$140	None	None	ACD, ARS, CDR, FMS, UCD
	Digital Centrex	100+	36, 60 or 84 months	Measured rate	\$200 to \$800 for system, depending on contract length	\$11 to \$17, depending on contract length	None	Message rate: \$.09 per call	Facility- and service-dependent; average cost per facility \$60 to \$140	None	None	ACD, ARS, CDR, FMS, UCD
Bell Atlantic Corp. Philadelphia (703) 974-5446	Centrex	2+	Month to month; 36 to 120 months	Measured or flat rate; flat rate available in Del., Va., and W.Va.	Up to \$1,000 for system; \$26.80 to \$45 per line	\$10.10 to \$22.28	Varies by LEC	Same as standard business lines	Varies by service	None	None	ARS, CDR, FMS, UCD, VM (external)
BellSouth Corp. Atlanta (404) 529-5026	Digital ESSX Service	15 to 400+ (over 400 priced as ICB)	Month to month; 36, 60 or 84 months	Measured or flat rate	15 to 400 lines, \$95 to \$250 per line, depending on contract length and features chosen; 400+ lines, ICB	\$14.50 to \$21.00	None	Message rate varies by LEC	\$35 per line for WATS (3), \$35 per line for 800, \$26.50 per line for tie line	None	None	ACD, ARS, CDR, FMS, UCD, VM (external)
Centel Florida Tallahassee, Fla. (904) 599-1898	Digital Business Service	3 to 20,000	30 days for 3 to 20 lines; 1 year for 20+ lines	Flat rate	\$25.01 for service; \$11.40 per line; \$18.25 per 25 lines for miscellaneous equipment	Up to \$25.81 per line, volume discounts available	None	None	None	NA	None	ACD, ARS, UCD, VM
Centel Illinois Des Plaines, Ill. (708) 297-5910	Centel Digital Service	No minimum or maximum	Month to month	Measured rate	\$20 for service; per line, same as business lines	\$15.66	Basic service: 1 to 100 lines, \$3.00 per line; 101+ lines, \$2 per line; Primary 1 Business Rate Service: Business Line Charge Adjustment, up to \$3.74 per line, volume discounts available	Message rate: \$.05 per call	None	None	None	ARS, CDR, UCD, VM
Centel Minnesota Burnsville, Minn. (612) 435-3600	Centel Digital Centrex Service	No minimum or maximum	Month to month	Flat rate	\$17.45 per line	\$48.65	None	Packages: \$4 to \$6 per line; per-line individual feature: \$1 to \$10	ICB	NA	None	
Centel Nevada Reno, Nev. (702) 877-7711	Centel Digital Centrex Service	No minimum or maximum	Month to month	Flat rate	No fixed fee; \$52 per hour for labor (1 hour minimum, billed in 1/10 hour increments) plus materials	1 to 5 lines, \$20.75 per line; 6 to 10, \$18.75 per line; 11 to 50, \$17.24 per line; 51 to 400, \$15.46 per line; 401+, \$13.72 per line	Feature group: 1 to 5 lines, \$10 per account; 6 to 10, \$20 per account; 11 to 50, \$40 per account; 51 to 400, \$140 per account; 401+, \$940 per account	None	None	NA	None	ACD, ARS, CDR, FMS, UCD, VM (external)
Centel North Carolina Hickory, N.C. (704) 328-0290	Centel Digital Centrex Service	No minimum or maximum	36 to 64 months	Flat rate	\$40.11 for service and order; \$8.64 per line; \$6.77 per premises visit	Distance- and contract length-sensitive; minimum charge of \$15.80 per line for half-mile with 60-month contract	Optional feature charges only	None	None	NA	None	ACD, ARS, CDR, UCD

This chart is based upon information provided by the carriers listed. Carriers may offer other services, and other carriers not listed may offer a full range of competitive services. Questions about chart listings should be directed to individual carriers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

Centrex services (continued)

Local exchange company	Product	Target market (lines)	Contract lengths available	Usage fee rating	Installation charges	Monthly line charges	Monthly system charges	Monthly usage fees	Monthly network interface fees	Number of free message units	Monthly minimum	Major features available
Centel Ohio Lorain, Ohio (218) 244-8440	Centel Centrex	No minimum or maximum	Pending legislative review	Flat rate; tiered rates under legislative review	\$18 for service order, \$32.25 for line connect	Tariff pending approval: \$10.65 for B-1 business line, \$1.65 for push-button, \$3.05 for subscriber line	Pending legislative review	Pending legislative review	Pending legislative review	Pending legislative review	None	ACD, ARS, CDR, UCD, VM
Centel Texas Killeen, Texas (817) 828-4409	Centel Centrex	2+	Month to month	Measured or flat rate	\$50 for Centrex Group, \$25 for Enhanced Package, plus materials and labor if needed	Average cost per line, \$34.19	Basic Centrex: 1 to 10 lines, \$9 per line; 11+, \$7 per line; Enhanced Centrex: basic costs plus \$5.10 per line	Same as standard business line	Varies by service	None	None	ARS, CDR, UCD
Centel Virginia Charlottesville, Va. (804) 977-0079	Centel Digital Centrex Service	No minimum or maximum	Month to month	Flat rate	\$6.78 for premises visit, \$10.80 for service order, \$10.29 per line in line contract	\$6.50 for Centrex, \$5.90 per line subscriber line charge; B-1, \$23.88 plus Centrex plus subscriber line charge; key, \$39.62 plus Centrex plus subscriber line charge	None	None	None	NA	None	
GTE Telephone Operations Irving, Texas (800) 366-4834	CentraNet	Primary, 3 to 100; secondary, 101 to 400; 401+, ICB	36 to 84 months	Flat rate, except in Calif.	\$20 to \$50 per line; \$50 to \$200 per customer group	\$14 to \$25 per line	None	None	\$50 to \$150 NRC per trunk; \$30 to \$50 MRC per month	NA	None	ACD (limited), ARS, FMS, UCD
Nevada Bell Reno, Nev. (702) 789-8686	Digital Centrex Service	7+	Monthly, to 7 years	Flat rate	\$1,200 to \$2,400 for system; average cost per line, \$64	\$15.50 to \$32.75 per line	None	None	None	NA	None	ACD, ARS, CDR, FMS, UCD, VM
New England Telephone and Telegraph Co. Boston (800) 348-8809 ext. 745	Nova Centrex	6 to 250	Up to 84 months	Measured or flat rate	\$50 per line	Average cost per line, \$16 for 60-month contract, under ½ mile distance from CO; varies by contract length and distance from CO	None	None	None	Flat rate, NA; measured, none	None	ACD, ARS, CDR, FMS, UCD, VM
	Intellipath	6+	12 to 120 months	Measured or flat rate	\$60 per line	Average cost per line, \$16 for 60-month contract, under ½ mile from CO; 250+ lines, ICB for all charges and features; varies by contract length and distance from CO	None	None	None	Flat rate, NA; measured, none	None	ACD, ARS, CDR, FMS, UCD, VM
New York Telephone Co. New York (800) 942-1212	Intellipath II	10 to 99	12 to 120 months	Measured rate	\$25 for system, \$69.10 per line	\$26.46 to \$23.02, varies by lines (4) and contract length	None	Message rate: \$.082 per call	None	None	None	ACD, ARS, CDR, FMS, UCD, VM
	Intellipath II	100+	12 to 120 months	Measured rate	\$25 for system; \$69.10 per line for 1 to 99 lines, \$41.10 for 100+ lines	ICB	None	Message rate: \$.082 per call	None	None	None	ACD, ARS, CDR, FMS, UCD, VM
	Centrex	5+	Month to month, 12 to 120 months	Measured rate	\$25 for system; \$138.20 per line	\$26.57	None	Message rate: \$.082 per call	None	None	None	ACD, ARS, CDR, FMS, UCD, VM
Pacific Bell San Francisco (415) 811-9000	Centrex	20+	ICB	Measured or flat rate	\$600 for system; \$70 per line	\$15.65	None	Same as standard business line	Varies according to service	Flat rate, NA; measured, none	None	ARS, CDR, FMS, UCD, VM (external)
	Centrex IS	20+	ICB	Flat rate	\$600 for system; \$70 per line; Package A, \$100 (5); Package B, \$120; Package C, \$150	Package A, \$17.50 per line (5); Package B, \$26 per line; Package C, \$29.50 per line	None	Same as standard business line	Varies according to service	NA	None	ARS, CDR, FMS, UCD, VM (external)
Southern New England Telephone Co. New Haven, Conn. (203) 771-5778	Centrex III	100+	Month to month	Flat rate	\$9.42 per line	\$18.59 (flat rate up to 1 mile)	None	None	None	NA	None	ACD, ARS, CDR, FMS, UCD, VM
	Small Business Centrex	10 to 99	Month to month	Measured or flat rate	Average cost per line, \$18.93	Average cost per line, \$24.61; actual (flat rate) for up to 1 mile, \$24.61, for 1 to 2 miles, \$30.76; measured rate for up to 1 mile, \$18.46, for 1 to 2 miles, \$24.61	None	Flat rate, none; measured, \$.03 to \$.05 per unit for initial minute and \$.01 to \$.02 per unit for each additional minute	None	Flat rate, NA; measured, none	None	CDR
	Dedicated Central Office Switched Service (DCOSS)	300+	60 and 84 months	Flat rate	ICB	ICB	None	None	None	NA	None	ACD, ARS, CDR, FMS, UCD, VM
Southwestern Bell Telephone Co. St. Louis (800) 225-7928	Plexar	2 to 200+	12 to 60 months	Flat rate	ICB, varies by state, features and size	ICB; varies by state and distance from CO	ICB; varies by state	Flat rate, ICB, varies by state	ICB; varies by service	NA	None	ACD, ARS, CDR, FMS, UCD, VM
US West Communications, Inc. Denver (800) 225-5879	Centron	10 to 100 and 100+ lines (1)	36 and 60 months	Measured or flat rate	\$48 per line (2)	100 lines and under, \$9.75 per line; 101+, \$7 per line (2)	None	Measured: \$.06 per unit for initial minute and \$.02 per unit for each additional minute	NRC for WATS, \$49.50; 800, \$49.50; tie line, \$54.50; MRC for WATS, \$2.70; 800, \$2.65; tie line, \$52	None	None	ACD, ARS, CDR, FMS, UCD, VM
	Centron I	1 to 14 (uses standard business lines)	Month to month	Measured rate	\$11 to \$25, varies by state	\$24.35 to \$51.47, plus standard business line charges; varies by state	\$5; discounted after 7 lines	Measured business line rate	NA	Measured business line allocation	None	VM

Footnotes

- (1) New separate mid-range Centron product for 10- to 100-line market due in the second quarter of 1990.
 (2) Based on 5-year contract.
 (3) ESSX Service prices listed here are based on a customer with 250 ESSX lines.
 (4) Includes first mile local loop. Extra charge for additional mileage.
 (5) A: 1B + D voice starter package; B: 1B + D Basic voice and packet package; C: 2B + D deluxe voice/circuit data/packet data package.

ACD = Automatic call distribution
 ARS = Automatic route selection
 CDR = Call detail recording
 CO = Central office
 FMS = Feature management system
 ICB = Individual-case basis

LEC = Local exchange carrier
 MRC = Monthly recurring charge
 NA = Not applicable
 NRC = Nonrecurring charge
 UCD = Uniform call distribution
 VM = Voice mail

The following carriers were unable to provide specific Centrex service information by press time: Centel and United Telecommunications.

This chart is based upon information provided by the carriers listed. Carriers may offer other services, and other carriers not listed may offer a full range of competitive services. Questions about chart listings should be directed to individual carriers or to TeleChoice at (203) 645-0471.

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(continued from page 37)

The impact of mileage on pricing varies by operating company. Still, the first question any user asks should be, "How far is it to the nearest Centrex serving office?" For some telephone companies, the product is not mileage-based; for others, it is, and that can make an enormous difference.

Users more than two to three miles from a Centrex office might have a hard time justifying the expense of monthly line costs. To combat this problem, some local telephone companies will install remote central offices on-site for their largest customers. Generally, there must be more than 500 to 600 lines at that site to warrant the extra expense.

There are interesting differences between Centrex products from different re-

gions. For example, there are two general ways that Centrex providers offer access to the service. Some carriers, such as Bell Atlantic and BellSouth Corp., have tariffed Centrex as an add-on service to standard business lines. Therefore, Centrex features and functions act as options to standard business lines. Whether a company gets charged for message units for local calls or pays flat rates for service depends on what's included in the particular company's business line service.

Other providers make Centrex a stand-alone service. They charge completely different rates for Centrex lines and features. Sometimes, these lines contain unlimited local calling options; other times, they have distinct message unit charges as well.

The price war between Centrex and PBX

providers is heavily tilted in the PBX direction, simply because PBX manufacturing is an unregulated business. The slow-growing PBX industry has seen rampant price cuts in recent years.

Regulated Centrex bids have had a difficult time competing on a pure price basis. While Centrex is competitive in most short-haul situations, PBX vendors have the ultimate luxury of being able to cut prices to win business.

Centrex providers are pressuring local regulatory bodies to relieve them of pricing constraints, claiming Centrex is a competitive service and should be deregulated. Their efforts have seen a certain degree of success. Many public commissions have either deregulated Centrex or approved off-tariff, individual-case-basis contracting for

Centrex services.

However, to some degree, local exchange companies are still limited in how price-competitive they can get. This has forced Centrex providers to emphasize the more intangible benefits of Centrex: fewer hassles, less responsibility and greater long-term flexibility.

Citywide Centrex

One major benefit that local telephone companies can offer over PBXs is areawide, or citywide, Centrex. Currently, PBX users often link different sites with off-premises lines or other similar tie-line circuits. These allow corporate employees to have integrated calling plans and features.

With citywide Centrex, users get the same functionality — feature transparency. Local telephone companies are enhancing these products with various capabilities, such as one that lets private net users bring off-network locations onto the private net using Centrex lines, thus making them appear on-net to the network.

Later phases of citywide Centrex will also allow compatibility among different local switch types. For example, while all switches may be able to do call forwarding, each switch does it differently. In the future, these dissimilarities will become transparent, allowing for interswitch Centrex.

Each telephone company may have a citywide Centrex offering, but these services are not compatible from region to region. Standards are being developed to promote interconnection among different areas to allow true national Centrex networks. Bell Communications Research has a National Multi-Location Business Group advisory forum, which is composed of various industry participants. This group is trying to standardize on features and network characteristics that will represent the first level of compatibility.

The development of related standards, such as ISDN and Signaling System 7, is likely to affect the speed at which these preliminary interconnection standards are approved. In addition, current regulatory hurdles must be overcome. The environment doesn't lend itself to full communication between the local telephone companies, limiting the degree to which joint planning can occur. Multilocation standards, nonetheless, are due sometime in the next two years.

The future of Centrex

Local telephone companies are betting their future on the intelligent network. Most of the fantastic functionality that industry visionaries associate with the network of tomorrow is driven by software.

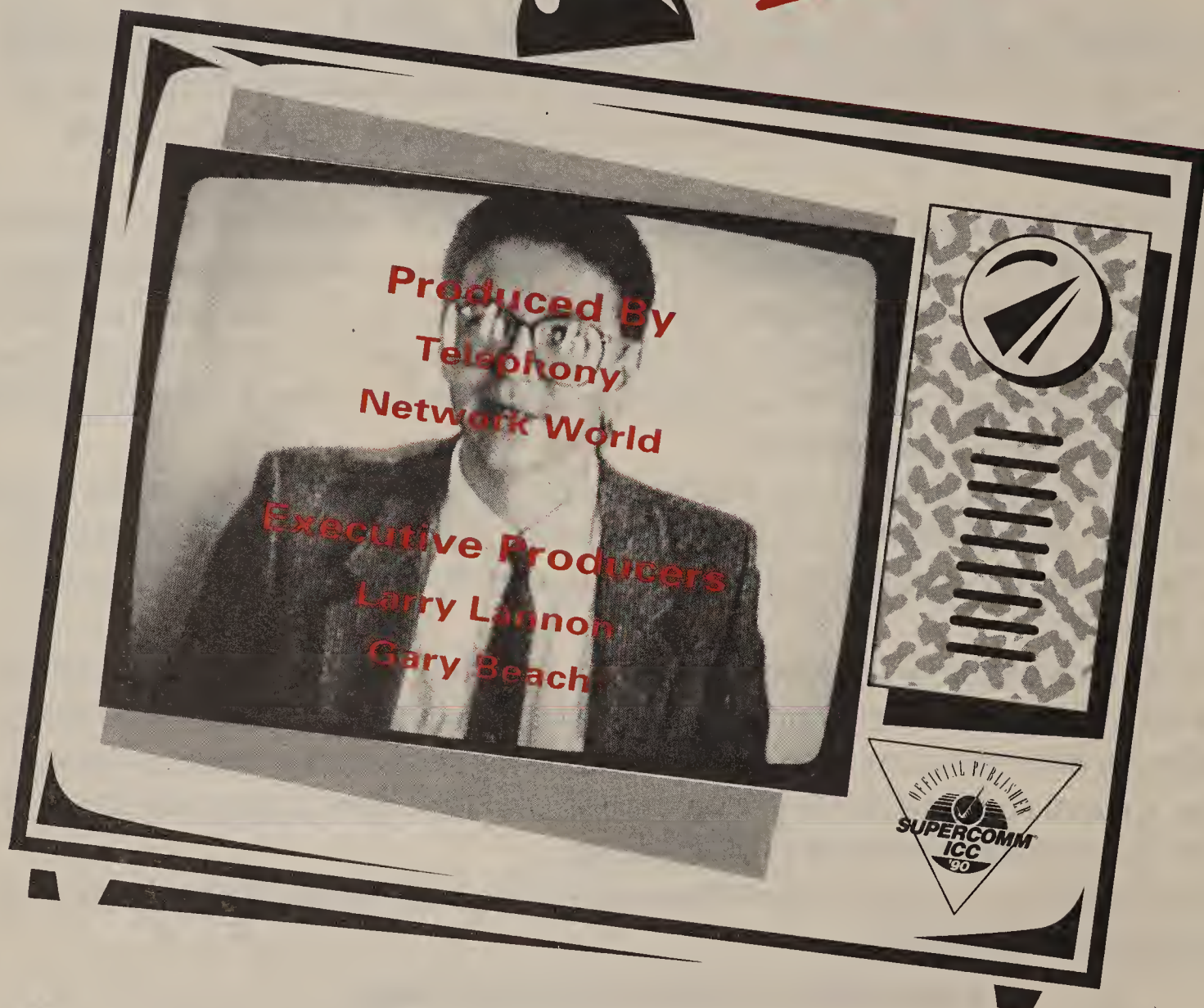
Stand-alone PBX hardware will have a difficult time competing with the sophisticated network software of the future. Where the hardware firms will be pushing to maintain public network compatibility with the newest services, Centrex customers will implicitly already have it.

This leaves a big question as to how PBX manufacturers are positioning themselves for this future competition. Meanwhile, PBX vendors are answering with extremely competitive pricing strategies, which is something most users find hard to resist.

Many users do not realize that PBX requests for proposal will also work for Centrex as long as they are not limited to premises-based products or products that have to be purchased. Users who write RFPs so that they are open to the Centrex option may be glad they did. ■

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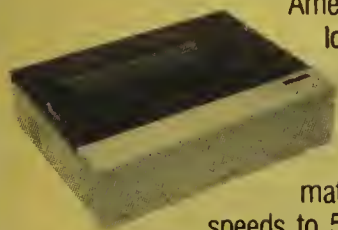
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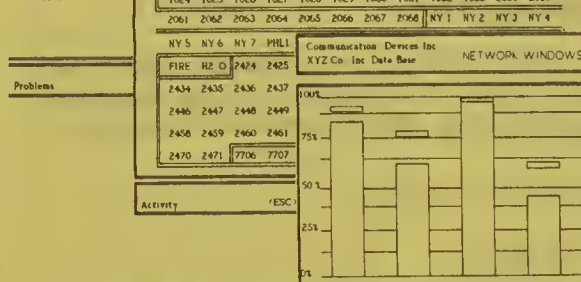
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11/17/87	08:40:21	2	NY 3	23	Carrier Loop	14
11/17/87	08:51					
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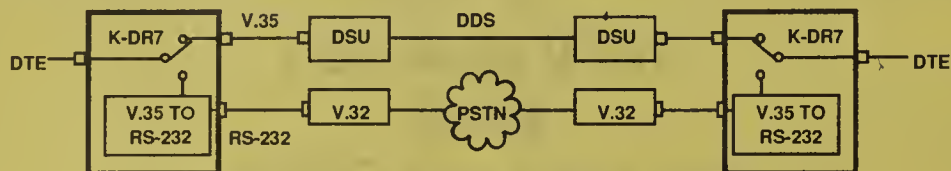


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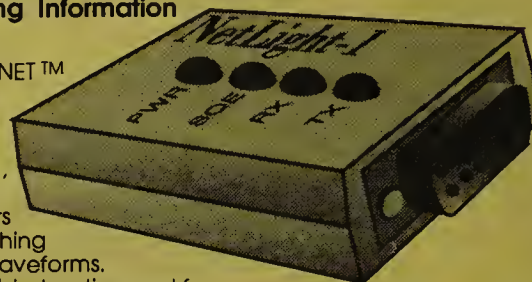
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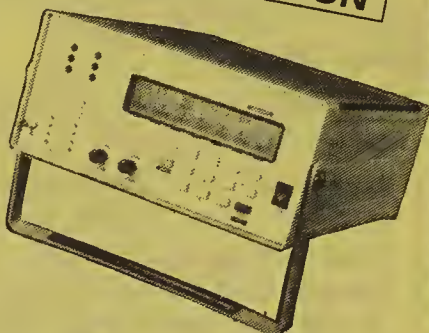
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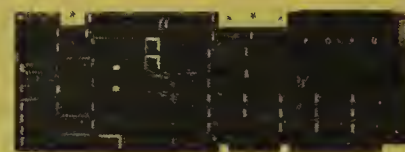
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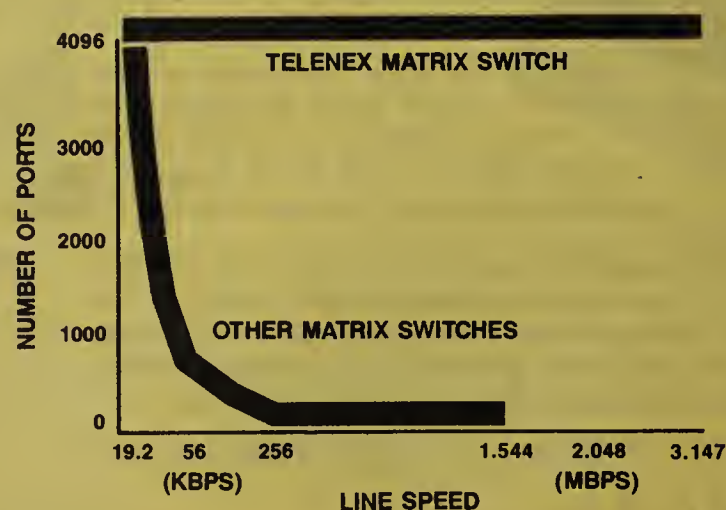
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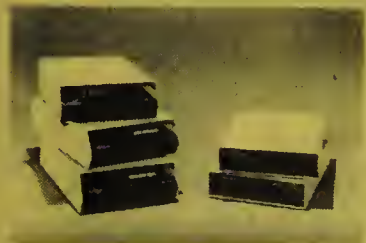
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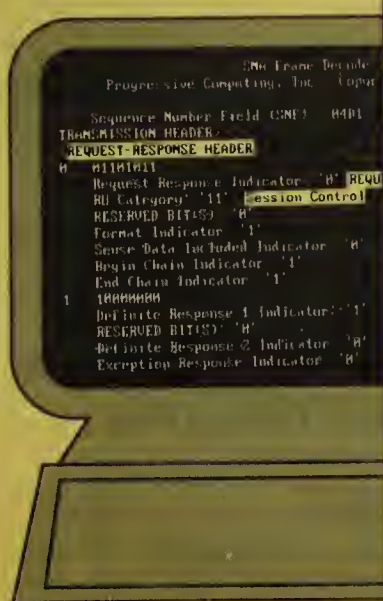
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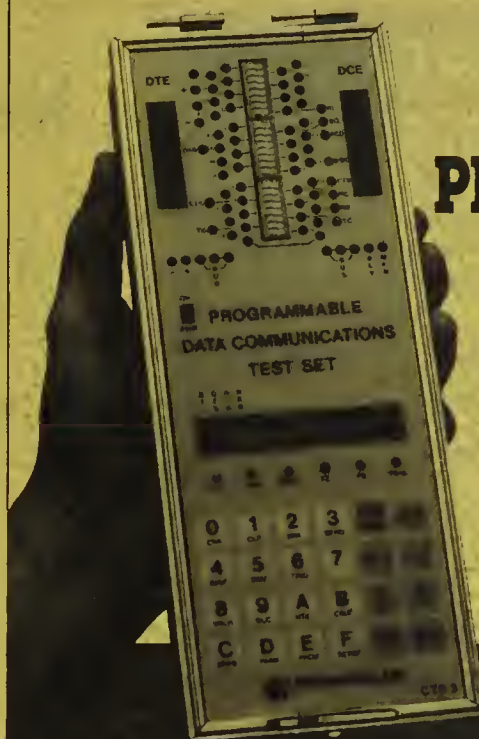
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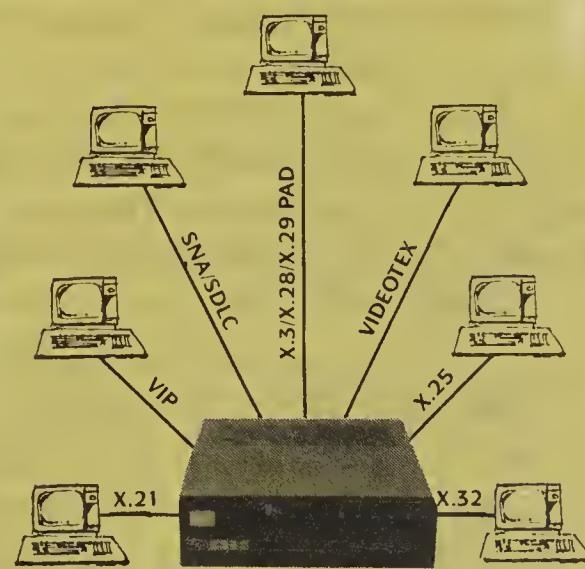
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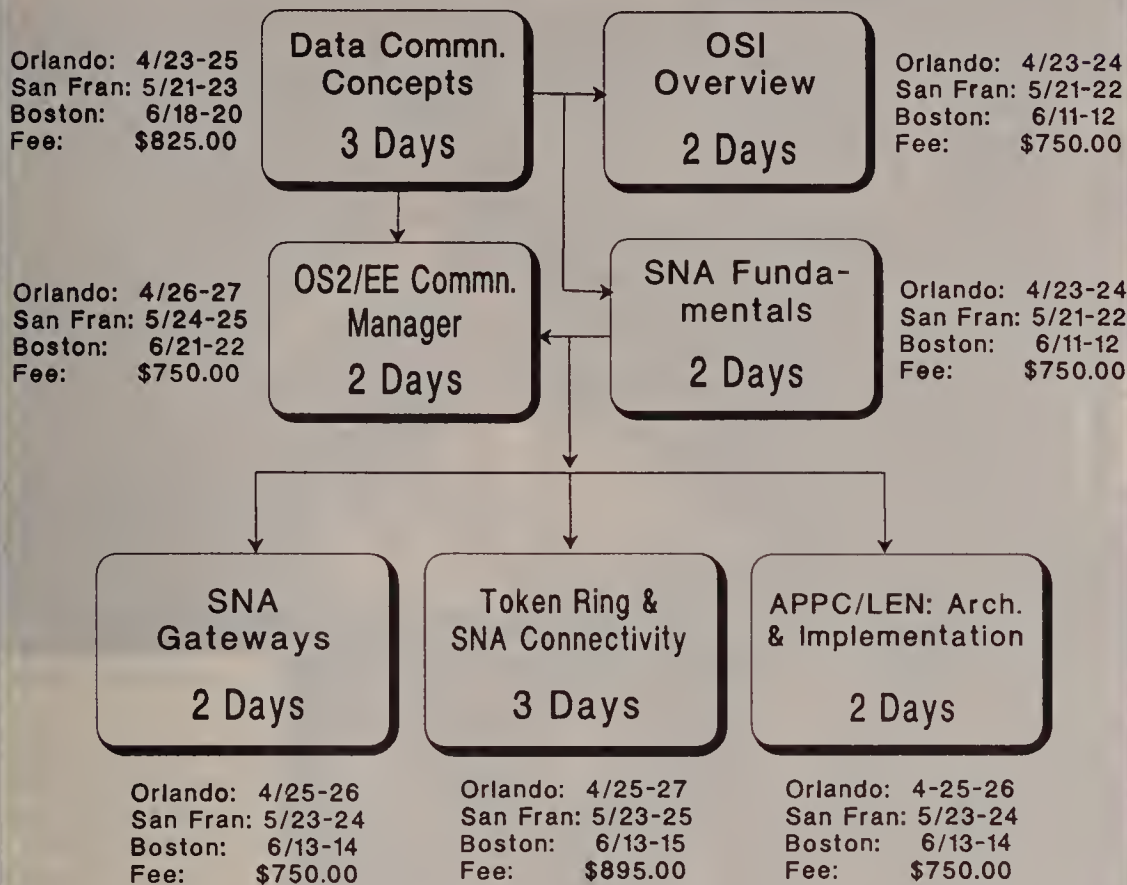
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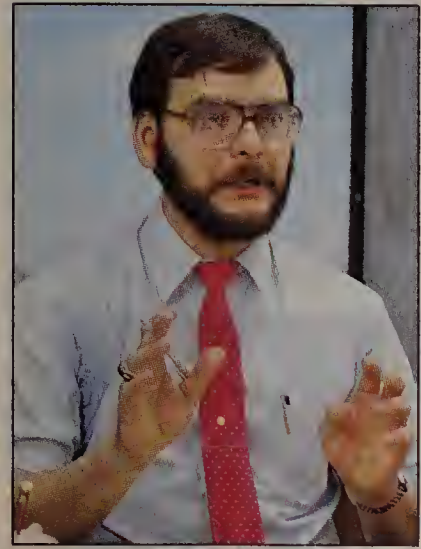
Fermi Labs eases traffic crunch

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Philip Demar, Fermi's network analyst in charge of wide-area networking.

In fact, the lab has been rationing the few precious DECnet addresses it has left.

Consequently, Fermi expects to migrate to DECnet Phase V as



Mark Kaletka

Sciences network (ESnet), Internet, the Magnetic Fusion Energy network and Bitnet, an electronic mail net. Additionally, the routing backbone links remote nodes to ESnet.

A Cisco Systems router, which Fermi refers to as a firewall router, sits between the campuswide DECnet and the routing backbone, ensuring that packets routed between remote sites do not congest the campus DECnet. The firewall router routes packets from the campus DECnet to the router that provides access to the appropriate WAN.

Initially, HEPnet was quite simple and did not generate enough traffic to congest the campuswide DECnet. Five years ago, HEPnet consisted of five star-configured WANs linked together by DECnet routers and 9.6K bit/sec circuits. The hubs of all star networks were located at

soon as it is available and could begin beta-testing the software as early as next month. DECnet Phase V would solve Fermi's single greatest problem: accommodating growth on the network while resolving routing issues unaddressed in Phase IV.

"From our point of view, we desperately need Phase V of DECnet right now," Demar said. "We need it for the address space, and we also need it to control routing boundaries." DECnet Phase IV does not support boundaries, which enable users to make one physical network appear as several logical networks in order to avoid routing problems.

Firewall router

While Phase V may ultimately resolve the networkwide DECnet addressing problems, net growth has also put strain on the campus DECnet. Fermi had to install what it calls a "firewall Ethernet" to keep its wide-area traffic separate from its LAN traffic. This firewall preserves bandwidth on the campuswide DECnet for memory-intensive applications that support research projects.

The firewall Ethernet consists of routers that provide connections between HEPnet and various other research networks. It also enables local users to access any of the supported WANs.

Today, Fermi manages HEPnet links that connect 36 universities to DEC Router 2000s via 19.2K bit/sec analog leased lines. The DEC Router 2000s are linked to the firewall backbone, which also supports Cisco Systems, Inc. routers and VAXes running router software.

The DEC Router 2000s link the universities to routers at labs that manage connections to other HEPnet sites. The router backbone is also used to link devices on Fermi's local DECnet to other research networks, such as the Department of Energy's Energy



Philip Demar

labs that supported point-to-point links to universities.

Because of its growth, HEPnet is being folded into ESnet. The Energy Department-funded network supports both DECnet and Transmission Control Protocol/Internet Protocol traffic between labs conducting various forms of energy research.

When ESnet was built two years ago, it linked LANs at eight research labs across the country

EDI package features gateway

continued from page 27

chief executive officer of TSI.

This will provide systems administrators with menus to develop the sequences needed to automatically integrate an EDI message into a production application.

In the past, users had to write a program to translate an EDI transaction into the format required for their application program. "This is the the black hole of EDI," Galley said. "Some users have 500 or 1,000 trading partners."

With Trading Partner, a user will select from a menu several functions — such as binary-to-character translation or file and

via 56K bit/sec lines supporting X.25. Later this month, the Department of Energy will complete an upgrade that will let ESnet link LANs at 22 labs via T-1 circuits.

DECnet addressing issue

While the firewall backbone helped Fermi control the growing traffic between remote sites, it did not resolve the DECnet addressing issue. Since each of the universities on HEPnet has its own DECnet, Fermi must ensure that no two HEPnet users share the same network address.

The company's net managers also had to contend with the fact that universities connected to HEPnet are connected to other networks, such as the National Aeronautics and Space Administration's Space Physics Analysis Network, that have separate connections to HEPnet.

"As universities connected to different networks, they were also connecting those other networks to one another," said Mark Kaletka, Fermi's manager of network systems.

This created addressing difficulties, Demar said. "From a DECnet point of view, our network environment became much more complex than simply HEPnet because we had this problem of interacting with other networks. DECnet was not designed for this type of environment. It does not scale well to a really large network like this."

Under DECnet Phase IV, a single DECnet can only be broken into 63 distinct areas, or subnets, with each area supporting up to 1,024 node addresses. Fermi needs far more than what Phase IV can deliver and has been pressing DEC to deliver DECnet Phase V. DECnet Phase V will support thousands of areas and well over one million addresses.

Until Phase V can be delivered, Fermi designed HEPnet to route traffic only between devices that have addresses within the first 46 DECnet areas. This enables users at different sites to use all the addresses in Areas 47 to 63 for internal purposes. ■

table lookups — that in the past had to be manually programmed.

Pricing and availability for the product, which will support X12, EDI for Administration, Commerce and Transport, as well as Uniform Communication Standard and Warehouse Information Network Standards, will be announced by June.

The Trading Partner product was in development long before TSI purchased the assets of TranSettlements' software division. But purchasing a product with an installed base of about 200 users gives the former data entry software developer more credibility in its fledgling EDI efforts, Galley said.

TSI is located at 295 Westport Ave., Norwalk, Conn. 06856; (203) 846-2101. ■

IP service offers alternative

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link into the federal research net.

Start-up costs

In addition to Cisco routers for speeds above 56K bit/sec, users must install a channel service unit/data service unit. Users operating at lower speeds can connect using a modem. All users will

UUNET bases its charges on the amount of bandwidth users lease from the carriers that supply the dedicated connection to the hub.

▲▲▲

incur start-up costs for the port cards they will require in UUNET's hub routers (see graphic, page 27).

UUNET bases its charges on the amount of bandwidth users lease from the local and interexchange carriers that supply the dedicated connection to the AlterNet hub. AlterNet supports user connections to its hubs at 9.6K bit/sec synchronous and asynchronous, 19.2K bit/sec, 56K bit/sec and T-1 speeds.

3Com to introduce WAN router

continued from page 2

users the option of simple bridging or more complex routing.

The bridge portion of the device operates at the media access control sublayer of the data-link level in the seven-layer Open Systems Interconnection model. When used as a bridge, the IB/3000 regulates traffic between Ethernet subnets according to the destination address of the data packets. The transport protocol is ignored.

When used as a router, the IB/3000 supports the Spanning Tree Algorithm (STA), which selects the optimum net path for data traffic between LANs. The router can also be used to set up logical network segments, each of which runs a different net protocol. If the selected path should go down, the STA automatically selects another route and reconfigures the internetwork.

The IB/3000 supports Transmission Control Protocol/Internet Protocol and Xerox Corp.'s Xerox Network Systems. Support for Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) will be available in the next release of the IB/3000 due out by year end, the source said.

Additionally, the IB/3000 supports both the Simple Net-

The company is also offering a feature it calls low-volume T-1 for users with bandwidth requirements closer to 56K bit/sec. Since the cost difference between a 56K bit/sec connection and a T-1 link to an AlterNet hub is minimal, a user can enjoy the higher throughput of a T-1 line for only a slightly higher price.

"We're kind of the new guy on the block, so we have to be a little innovative," Adams said, adding that this experimental offering is something of a risk because it requires users to be honest about their bandwidth needs.

The company said its service provides a cost-effective alternative to X.25 public networks such as the Telenet network offered by the Sprint Data Group. To run IP data at 9.6K bit/sec over a public data network between California and Paris would cost \$4,000 per month plus an additional volume-based charge, Adams said.

By contrast, on AlterNet, a 56K bit/sec dedicated connection between the same sites would cost less than \$3,500 per month and would not have an extra fee based on volume.

Adams said UUNET is forming a commercial subsidiary to run AlterNet.

Pricing for the AlterNet service varies.

For more information about the service, UUNET can be reached by writing to 3110 Fairview Park Drive, Suite 570, Falls Church, Va. 22042, or by calling (703) 876-5050. ■

work Management Protocol and Common Management Information Protocol Over TCP/IP network management standards. The IB/3000 can be managed from a local or remote personal computer or via Telnet access from any TCP/IP device on the LAN, the source said.

Analysts gave 3Com high marks for the IB/3000, saying it represents the next generation of routers at a price that was affordable to midsize personal computer LAN users supporting 30 to 50 nodes.

At a cost of \$8,000, the IB/3000 is 35% to 40% less expensive than similarly configured offerings from Vitalink Communications Corp., Cisco Systems, Inc. and Wellfleet Communications Corp., according to Rick Villars, manager of computer networking strategies at International Data Corp., a market research firm in Framingham, Mass. Those company's products range in price from about \$12,000 to \$14,000, he said.

Vitalink, Cisco Systems and Wellfleet products are aimed at users with networks of 100 or more nodes and usually support connections to eight or more remote Ethernet and token-ring LANs, Villars said. ■

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DataTrade lets traders get data

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IBM's industry marketing group.

IBM did not say when DataTrade will be available but promised it would be out by December. The product is not yet in beta test.

The company also announced that eight financial software providers have agreed to tailor their applications to work with DataTrade.

Client/server approach

DataTrade's server portion runs on any of the supported hardware platforms, and the client software runs on a PS/2 under OS/2 and the AIX-based RISC System/6000.

The software enables workstations on IBM Token-Ring Networks or Ethernets to access servers supporting internal data bases or applications that take feeds from information sources such as Dow Jones & Co., Inc. and Reuters Holdings PLC. Workstations on the Token-Ring LANs communicate with the servers using IBM's Advanced Program-to-Program Communications protocol or Transmission Control Protocol/Internet Protocol; Ethernet-based workstations use only TCP/IP.

DataTrade's API insulates application programmers from having to deal with the operating system and transport protocols the application will use. That not only makes the programmer's job easier, but it ensures that the same application will run on any of the supported operating systems or transports, Simmons said.

The API also gives applications access to DataTrade's communications software. That software uses APPC or TCP/IP to communicate point-to-point between a workstation and a server or uses a new proprietary IBM protocol to communicate in a broadcast mode, Simmons said. Users can communicate from a single workstation to various servers, such as one supporting software that links to Dow Jones, or to Reuters.

A trader who specializes in foreign securities, for example, needs data on foreign currency markets. To get that data today, the trader would call it up on a separate terminal or call another trader who has access to that information.

With DataTrade, foreign secu-

rities traders can access various third-party data sources as needed from a single workstation and then integrate that data into applications that help them analyze it.

A sampling of the business partner applications announced includes software from FD Consulting, Inc. in New York that reads most market information sources and stores the data in a real-time data base.

Another vendor, V.I. Corp. of Amherst, Mass., will offer graphical interface software that can analyze financial data according to user-defined parameters.

The trading marketplace was the driving force behind DataTrade, but according to Simmons, "It is available to other parts of IBM that service other industries to find appropriate uses for it. There's really no reason why this has to be just a financial services or trading system offering."

DataTrade server software is priced at \$10,500 for the PS/2 under OS/2, from \$15,000 to \$24,000 for the RISC System/6000, and from \$21,000 to \$115,000 for the System/88. Client workstation software is priced at \$1,000 for a PS/2 and \$2,000 for a RISC System/6000. □

Covia plans big rollout

continued from page 1

gramming interfaces provided with LAN Manager let Covia tie the operating system to its own homegrown software.

"We don't evaluate software like we would a horse race," Wejman said. "We evaluate it according to what strategically fits our direction."

For more than two years, Covia has been installing about 100 IBM Token-Ring LANs per month, mainly in travel agencies and reservation offices, Teflian said. The LANs support FocalPoint, Covia software that gives travel agencies access to Apollo.

Covia also installs LANs that give users at United Air Lines, Inc., one of its seven parent airlines, access to other mainframe-based airline applications.

Today, those LANs are based on NETBIOS and Open Systems Manager, which is communications software Covia developed to let its applications run on different vendor's hardware under different operating systems.

Now Covia is ready to migrate its LANs to OS/2 servers based on LAN Manager, Wejman said.

"It'll make our system much more powerful and allow us to place intelligent workstations in areas that we have been reluctant to because of security and diagnostic issues," Wejman said.

Those areas include airports and large travel agencies where enhanced security features are needed to prevent unauthorized users from accessing Covia's net.

Network management

Among the network management features Covia expects to take advantage of with LAN Manager are software distribution mechanisms that will allow the company to disburse software to its users and collect management data from a central site.

Covia was reluctant to buy LAN Manager from Microsoft OEMs because the product is too important to its long-term strategy, Teflian said.

"We feel we cannot get any of our critical operating system components through third parties," he said. "We need direct

engineering relationships. I need people at Microsoft that understand our architecture."

Microsoft said the Covia deal is not an indication that it has changed its marketing strategy. To date, Microsoft has sold LAN Manager strictly through third parties, although it is widely rumored that the firm is gearing up to sell directly to end users.

"Our relationship with Covia is similar to an OEM relationship," said Stephen Kanzler, national marketing manager for Microsoft's network business unit. "We haven't announced a change in our distribution strategy."

Down the road, Covia hopes to use its LANs to off-load applications from its mainframes, such as United flight information and passenger boarding programs.

Covia is currently testing such a LAN-based application in Philadelphia, where information pertinent to the airport there is downloaded to and stored on the LAN. Microsoft's SQL Server gives workstations access to the data as it is needed, and only occasional updates are required to the mainframe applications. □

Sprint Int'l signs deals abroad

continued from page 6

but we realize it may not materialize immediately," he said.

Sprint International also entered into a joint venture with Elektrisk Bureau of Oslo, Norway, to sell and distribute data communications products in Scandinavia.

Sprint International also announced the opening of switching centers in London and Amsterdam.

Users in those countries will now be able to get a direct connection into the carrier's packet network, SprintNet. Once on the network, users can reach 90 countries.

Parent company US Sprint also announced it is buying an un-

disclosed interest in the Asia-Pacific Submarine Cable linking China, Hong Kong, Japan and Singapore. When the cable is completed in 1993, US Sprint will be able to offer end-to-end fiber-optic, digital facilities almost around the world, Guidi said. US Sprint already owns a 50% interest in Private Trans-Atlantic Telecommunications-1, a transatlantic fiber-optic cable. □

ImagePlus speeds check handling

continued from page 1

tached to a 16M bit/sec Token-Ring Network. It will also enable users to store images on magnetic or optical media and print images for customer statements.

According to Leighton Carmichael, director of document and check image systems for IBM, the product was developed with help from the Bank of Montreal, Bank of New England Corp., Mellon Bank Corp., NCNB Corp., the Royal Bank of Canada and Security Pacific Corp.

These banks will be the first to implement the system, but 15 other financial institutions have signed up to have HPTS installed in the next 12 months, IBM said.

The HPTS system is designed to be used with IBM 3890/XP mainframes supporting IBM's Check-Processing Control System (CPCS) and running MVS/ESA. It costs between \$600,000 and \$1.2 million.

The HPTS package includes:

- The 3898 Image Processor, which can read machine- or hand-printed dollar amounts from the image after it has been captured by the scanner.

- The 3892/XP Document Processor, which can encode information on a check at up to 500 pieces per minute. Previously, encoding bank information on a check had to be done manually.

- The 3897 Image Capture System, a scanner that can capture 2,400 check images per minute.

The software portion of HPTS includes a work-in-progress function that tracks the flow of work and allows network managers to monitor the performance of staff and hardware.

As bundles of checks arrive from bank branches, they are fed into an IBM check reader/sorter that is equipped with the new 3897 Image Capture System. The check images, which contain

roughly 2.5M bytes of information, are compressed to 40K bytes of data.

The 3898 Image Processor, running Image Processor Recognition Services software, reads the machine-printed or hand-printed dollar amount and, using account information the reader/sorter picked up from the string of numbers on the bottom of the check, processes it.

If the dollar amount cannot be deciphered by the image processor, the image is automatically sent on the LAN to a workstation, where an operator reads the amount and keys in the information. This increases productivity because the workstation users no longer have to handle paper.

According to Scott McCready, director of image services for International Data Corp., a market research firm in Framingham, Mass., it costs banks about 50 cents to process a check and, depending on volume, HPTS could save 10 cents per check.

McCready said HPTS should be a major boost for imaging, but for now, the cost of HPTS might limit its audience.

"You're probably looking at 50 of the top banks that can justify this investment," McCready said. "It's an important product definitely aimed at large money center banks."

Dick Griffith, executive vice-president of Bank of America National Trust & Savings Association's world banking group, said the bank will be installing the HPTS system at one of its offices in San Francisco or Concord, Calif.

"I think it's an exciting announcement," Griffith said. "But it's still expensive. [We have] 49 3890 [reader/sorters], but you won't see us ordering 49 [HPTSs] tomorrow." □

Exec says AT&T will intro SDDN

continued from page 2

port additional speeds, he added.

According to Nacchio, the 384K bit/sec and T-1 speeds will be achieved by stacking 64K bit/sec clear channels. This will have major implications for data communications, Nacchio said, paving the way for high-speed switched applications such as image networking.

AT&T already offers a switched T-1 service, Accunet Reserved 1.5, but that service can only be accessed at prearranged times.

The company also offers a switched 56K bit/sec option to its Software-Defined Network (SDN) customers, but it is considered expensive and is not widely available, according to analysts.

ENTELEC members were excited about the news. "If ISDN were available where we need it, we could justify dialing up a high-

speed pipe for imaging, graphics and bulk transfer of voice mail," said T.J. Talley, manager of telecommunications and engineering services for TU Services, Inc., the communications subsidiary of Texas Utilities Co.

In related news, Nacchio also told ENTELEC attendees the carrier will introduce VoiceMark, a nationwide voice mail service, by the end of the month. The service, which is being trialed in Atlanta, enables users to record and send messages to telephones in the U.S. and 150 other countries.

VoiceMark, which requires no hardware or software, costs \$1.75 for automated delivery, in which the message is read to whomever answers the telephone, and \$2.50 for person-to-person delivery, in which an operator only delivers the message to the intended recipient. □

Free RBHCs could stretch FCC to limit

continued from page 1

portant FCC initiatives, such as price caps for local exchange companies, might also be frustrated.

According to Brian Moir, counsel for the International Communications Association (ICA), "Sikes said he had enough staff to work on price caps [for local exchange companies] but not enough to work on anything else."

Jeff Linder, counsel for the Telecommunications Association, Inc. (TCA), added, "I don't think the FCC has the horses" to oversee the RBHCs.

Richard Firestone, chief of the FCC Common Carrier Bureau, disagrees. "We've done a lot in recent years in [establishing] RBHC safeguards, and we've done a lot in recent months to enforce those rules. We've been answering enforcement questions," he said.

But observers said the FCC has been straining to keep up with the increasing regulatory demands placed on it since divestiture. Sikes is currently fighting for the largest budget increase for the commission in five years.

In testimony before the Senate Commerce Appropriations Committee in February, Sikes said the FCC's "ability to perform effectively" in meeting its expanding responsibilities might be endangered because of a tight budget and limited staff.

Sikes' fiscal 1991 appropriation request is about \$118 million, up from the agency's current \$107 million budget. Even with the increase, Sikes asserted that the FCC will have 20% less in staff and funding than it did in 1981.

He acknowledged that lower budgets and staffing have resulted in slow processing of applications and delays in enforcement of FCC regulations. Tariff backlogs have been reduced, and some issues in the broadcast arena have advanced, he said, but only at the cost of strained resources.

According to the FCC's annual reports, the agency's budget dropped from \$95.4 million in 1985 to \$90.3 million in 1986 and bounced back up to \$97 million in 1987. The commission's budget grew again between 1988 and 1990, from \$99.6 million to the current \$107 million.

TCA's Linder said the increases have not kept pace with the agency's responsibilities. "Even if [the FCC's budget growth] is \$5 million per year, in absolute terms, it's probably shrinking," he said.

Proponents of "Free the Bells" draft legislation currently being debated said funding won't be a problem. Under the bill, sponsored by Reps. Edward Markey (D-Mass.) and Matthew Rinaldo (R-N.J.), the FCC would be given an additional \$10 million during the first year of its new responsibilities, according to Mike Connolly, an aide to Markey. After that, funding would be discretionary, he said.

But critics also point to insufficient FCC staffing as an obstacle. They say the agency hasn't had a significant increase in staffing since 1984, even though the telecommunications industry has changed dramatically since then.

In 1985, the FCC employed 1,825 full-time workers, while it has 1,750 full-time positions authorized for 1990. Staffing within the agency's Common Carrier Bureau — which oversees 1,360 local exchange companies, other common carriers and AT&T — has actually declined. The bureau had 318 full-time employees in 1985, 313 in 1988 and has been autho-

riized 308 positions for 1990, an FCC spokeswoman said.

The Markey bill would grant the RBHCs permission to establish separate subsidiaries to engage in certain manufacturing and information services endeavors. Critics of the proposal say the FCC would have to shift some staffers from current responsibilities in order to monitor for anticompetitive abuses by the carriers in new markets.

Connolly downplayed that concern, saying auditing of the subsidiaries would be done through independent firms.

But ICA's Moir said the FCC's record in enforcing cross-subsidization rules for RBHCs and their subsidiaries has not been good and extending the agency's oversight responsibilities could lead to problems.

For example, Moir called the FCC's re-

cent fining of Nynex Corp. an isolated event. In February, the agency fined Nynex \$1.4 million for overcharging users nearly \$120 million between 1984 and 1988 by buying equipment and services at inflated prices from an unregulated subsidiary.

In an interview then, Moir said, "You can't talk about the Nynex decision as [part of] a pattern, but literally as a lone decision over a period of years."

Jose Rodriguez, chief of the Common Carrier Bureau's auditing branch, said two or three auditors are usually involved in an audit of an RBHC. He conceded that the Nynex audit was complex, with about five, perhaps as many as six, auditors involved.

The Common Carrier Bureau's Firestone was quick to defend the FCC in the Nynex audit. He said the FCC uncovered

the illegal activities through its established auditing practices long before the press began highlighting Nynex's problems.

He said the FCC has already established field monitoring and electronic record-keeping capabilities that will be brought to bear if the agency has to shoulder any additional oversight responsibilities.

The bureau chief added that implementing price caps would ease pressure on the agency. "The price cap system changes the incentive for cross-subsidization," he said. "The [RBHCs] aren't as likely to engage in the practice."

Firestone acknowledged that the FCC would need some additional resources to support the new oversight chores but declined to specify what these resources would be. □

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Teleport unit buys Merrill Lynch switches

continued from page 4

MCI Communications Corp. a five-year, \$150 million contract for long-haul services and announced plans to hand over network management operations to IBM and MCI.

The company later backed off the IBM/MCI net management agreement when network personnel began resigning out of fear that they would lose their jobs when IBM and MCI took over. The proposal is still under consideration, although Merrill Lynch is said have put the issue on the back burner.

DuWayne Peterson, executive vice-president of operations for systems and telecommunications at Merrill Lynch, said

the deal with Teleport is expected to "turn a heavy cost into a potential profit center."

The 5ESS switches, which are located at Merrill Lynch's World Financial Center headquarters here, were underused by Merrill Lynch, which bought them in the mid-1980s before the financial services market took a nosedive, sources said. The switches, which support some 9,600 employees at Merrill Lynch, have the capacity to handle up to 250,000 phone calls an hour during peak calling periods.

Teleport will compete in the switched services market on the basis of reliability and high quality, as it does in the private-line market, said Bob Atkinson, senior

vice-president of regulatory and external affairs at Teleport. "We are not intending to be a low-cost service provider," he said.

"This agreement is a logical extension of the whole collocation ruling," said Mark Lowenstein, telecommunications analyst at The Yankee Group, a Boston-based market research firm. "The same types of customers that use Teleport's private-line services will go for the switched services."

TC Systems expects to provide advanced services and features to Merrill Lynch by taking advantage of the Integrated Services Digital Network features supported by 5ESS switches.

Teleport last year accepted the invitation by the New York State PSC to participate in commission-sponsored trials of ISDN services. □

X/Windows users describe benefits

continued from page 6

dow display. "With an X terminal, you essentially have a CPU dedicated to the display so when you do something like compile a program, the windowing system remains highly interactive without the sluggishness that's typical on a workstation," Korb explained. "It's a nice division of labor."

The University of Waterloo in Waterloo, Ontario, last spring replaced several Sun Microsystems, Inc. workstations on a campuswide Ethernet with X/Window terminals in a text-editing application for the *New Oxford English Dictionary*, which is published by Oxford University Press.

"We found Sun workstations to be overpriced, underpowered and noisy," said Tim Bray, manager of the dictionary project at the university.

Although his college has not yet invested in X/Window terminals, Brian Capouch, network specialist and instructor in computer science at St. Joseph's College in Rensselaer, Ind., is sold on the technology's promise.

St. Joseph's is testing X/Window terminals as a possible replacement for the approximately 100 personal computers and workstations on a campuswide Ethernet at the 800-student college.

One benefit Capouch sees in X/Windows is the ability to simultaneously display windows for programs running on multiple processors, both on and off the campus network. Because the university has Internet access, a student could have a window to a local host running a word processing application, a window to the university library's card catalog and a third window to a Telnet host on the Internet.

Students exploiting this capability could cut and paste information from the Telnet host and the university card catalog into a term paper being compiled on a word processing program executing on a local processor. □

HP enters 10BaseT with EtherTwist line

continued from page 4

DOS workstation under HP's OpenView graphical user interface, which is based on Microsoft Corp.'s Microsoft Windows.

For adapting workstations to 10BaseT, HP introduced the EtherTwist PC Link, an eight-bit card for IBM Personal Computers, and the EtherTwist Micro Channel Link for IBM Personal System/2s.

For converting workstations that already have Ethernet adapters, HP unveiled the EtherTwist MAU, a mouse-sized unit that plugs into the AUI port on existing coaxial Ethernet boards.

HP's final new product, the Wire Test Instrument, addresses the problem of determining whether the existing telephone wiring in a building will support 10BaseT LANs. Weighing less than 10 pounds, the product tests key parameters specified for 10BaseT networks and can evaluate bundled 25-pair and individual four-pair cabling.

The EtherTwist Hub is priced at \$1,899, the EtherTwist Hub Plus costs \$2,299, and the OpenView Hub Manager software costs \$1,499. The EtherTwist PC Link adapter is priced at \$445, the EtherTwist Micro Channel Link costs \$595, and the EtherTwist MAU has a list price of \$159. The wire-testing instrument costs \$9,500. □

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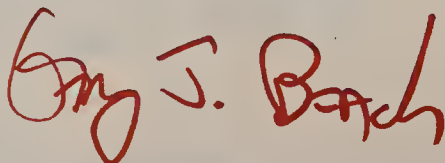
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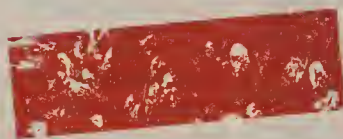
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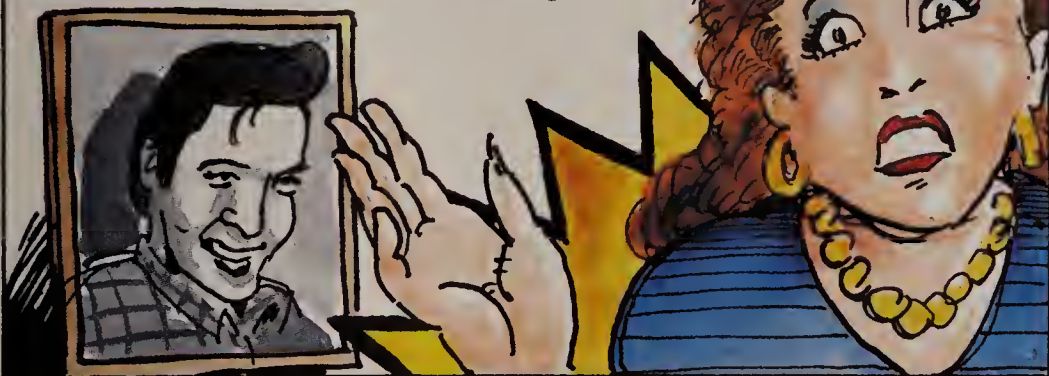
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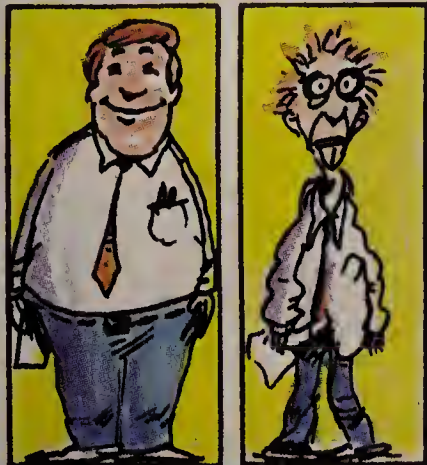
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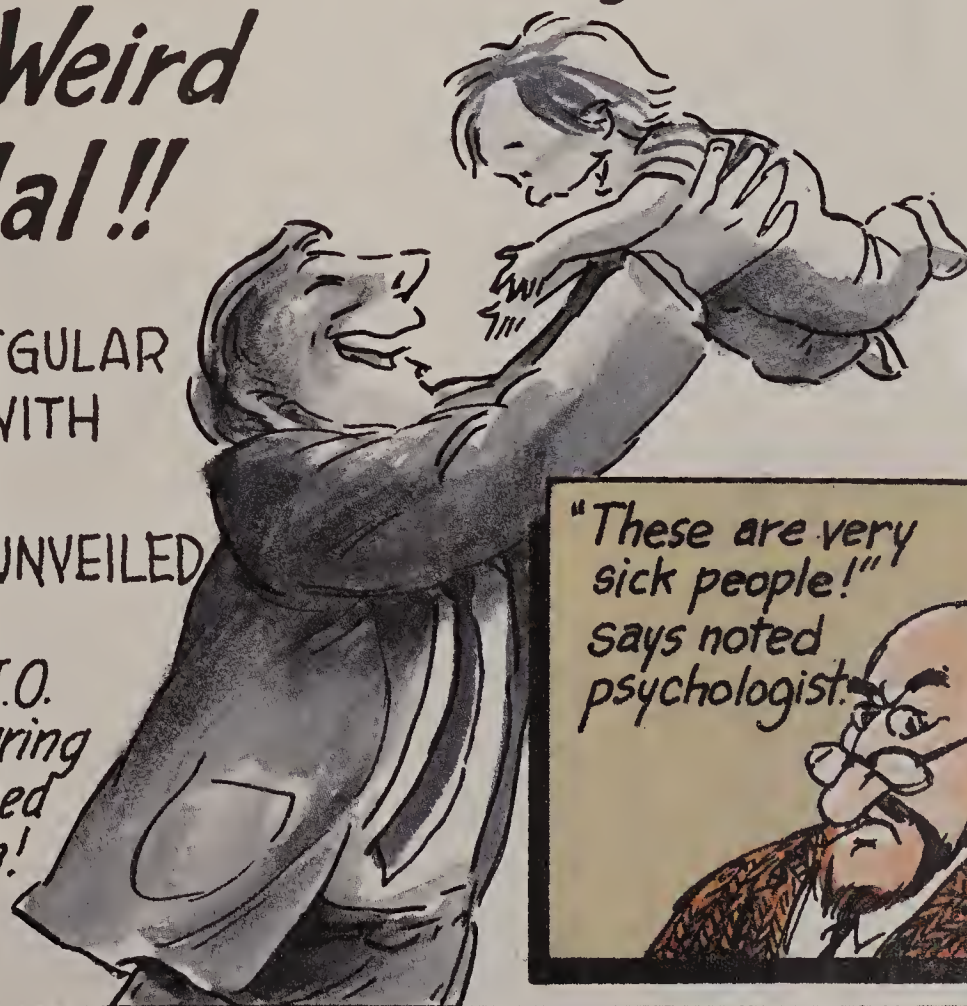


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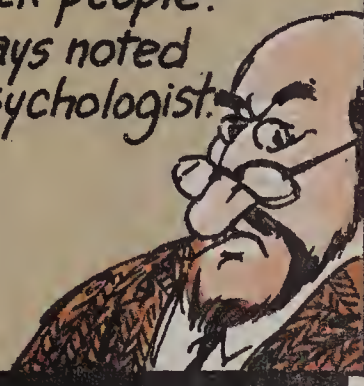
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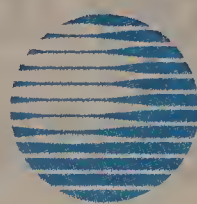
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